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Part four

READJUSTMENT PROCEDURE

Introduction

This section serves as a reference for all adjustment points in the Computer Mk 1, Mods 0-4, 6-10, 12, and 13, and the Star Shell Computer Mk 1, Mods 0, 1, and 2.

The introductory chapter on *Covers* gives information about the construction and securing devices of the covers and cover windows, together with precautions to be observed when removing, handling, and replacing these parts.

All adjustment points and assembly clamps are listed in numerical order for ready reference. The location, method of checking, and adjustment procedure are given for each adjustment. In most cases, the check and adjustment procedure depend upon other parts of the instrument being operative and in correct adjustment.

The necessity for readjustment is made evident only through trouble analysis. The chapters which deal with analysis of test errors and unit check tests contain a carefully worked-out procedure for locating adjustment trouble. Also, the chapters on removal and replacement of mechanisms contain lists of adjustments to be remade or checked. In all of these cases the adjustment numbers are listed in a definite sequence which, when followed, will expedite the job. In order to avoid possible damage to the mechanism, it is advisable for all maintenance personnel, no matter how well experienced, to follow this sequence carefully.

The partial schematic diagram which accompanies each adjustment is intended to show the units and other adjustments which would be affected. If any extensive readjustment is necessary, however, reference should be made to the complete schematic diagram in order to gain an over-all picture of the job.

It is not advisable to use the readjustment procedure as a reference if an instrument must be completely readjusted, that is, if it was dismantled and reassembled with all adjustment clamps left loose. In such a case, refer to *Factory Adjustment Procedure*, page 815.

The readjustment procedure gives an individual check for each numbered adjustment. In the check, the necessary computer setup and procedure are given for determining the accuracy of the adjustment. If the results of the check are unsatisfactory, the readjustment should then be made, using the *same setup*.

In some cases, locational directions are given with respect to the right, left, front, or rear of the instrument. These should not be confused with the *apparent* right, left, front, or rear of any part of the instrument as viewed through an access opening. The directions used for reference are explained in the chapter on *Covers*.

In making most of the adjustments, it is helpful to make the clamp slip-tight. When a clamp is slip-tightened properly, the adjustment can be slipped with light pressure, but it is tight enough to hold while the check is made. In this way, critical adjustments can be made a little at a time, gradually approaching the correct position. Then, since the clamp is slip-tight, a slight additional turn of the clamping screw will make the clamp fully tight without disturbing the adjustment.

Usually, when an adjustment is slip-tight, the related parts are brought into position by turning the gearing. A gear-pusher may be used for this purpose. Such a tool should be made of *soft metal*, such as aluminum, and should have a wedge-shaped end which can be applied to the base of a gear tooth in order to turn the gear. *Never touch gear teeth with hard metal such as a screw-driver blade.*

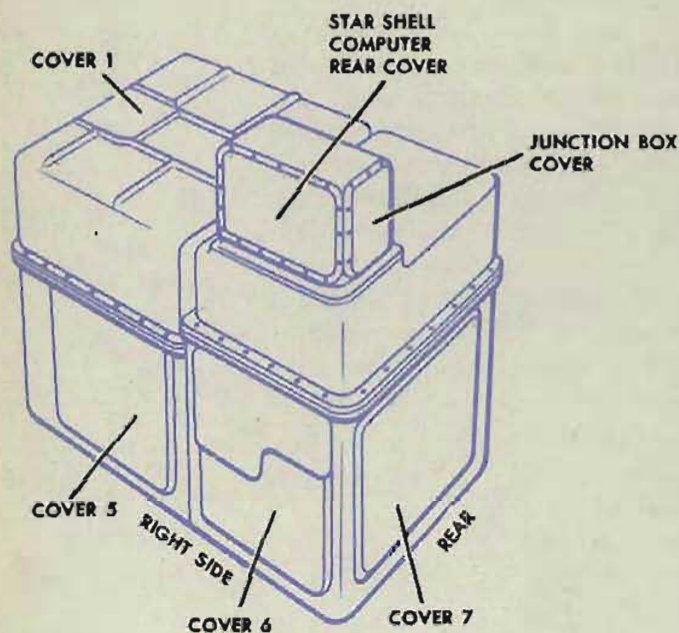
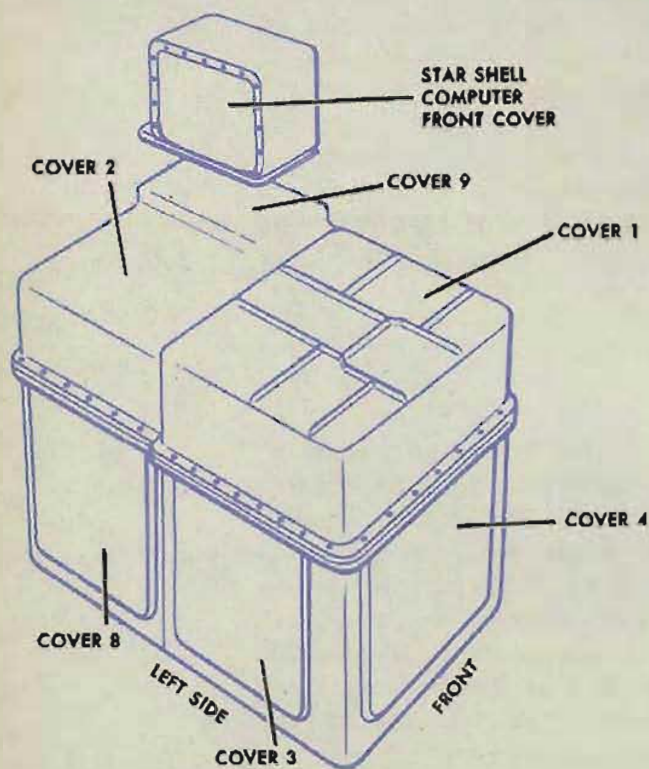
When making setups of various quantities, it is often desirable to wedge shaft lines in position temporarily. This may be done by inserting a wedge between the side of a gear and a fixed hanger or plate. The wedges may be of material such as linen bakelite. It is advisable to have a supply of wedges on hand for use during checks and readjustments. Avoid the use of bits of wood or metal, as they may leave chips in the instrument or damage finished surfaces. When using a wedge, make sure that the parts being wedged are substantial. *Never wedge differentials or counters.* The wedge should be inserted with light pressure only, never hammered in place. If the proper location for wedging is selected, light pressure will create enough friction to hold the line.

In making some adjustments, a dial indicator is used to measure motion of parts. Any suitable indicator which reads to 0.001 inch may be used. It should be clamped in place so as to read true motion of the part being observed. For example, in the adjustment of A-126, an indicator is used to measure motion of the $dH \sin E$ rack. If the type of indicator having a pivoted contact arm is used, the arm should be set perpendicular to the direction of motion of the rack. If the plunger type of indicator is used, the plunger should be parallel to the direction of motion of the rack.

When an adjustment calls for setting a synchro motor or generator on electrical zero, a standard motor (test synchro) should be used. Refer to page 183 for instructions on connecting a standard motor to the instrument wiring. If it is connected to a synchro motor, the standard motor may be used to hold the electrical zero position of the synchro while the adjustment is made. If it is connected to a synchro generator, the standard motor will indicate the position of the generator rotor, which may then be manually positioned at electrical zero by turning and wedging the gearing.

In the special case of the star shell differential generators, two standard motors may be used to set electrical zero. The stator leads of one standard motor are connected to the *stator* leads of the differential generator. This motor should be held on electrical zero. The stator leads of the other standard motor are connected to the *rotor* leads of the differential generator. This second motor will then indicate the position of the generator rotor, which may be manually positioned at electrical zero by turning and wedging the gearing. When two standard motors are used in this way, it is important that both be energized from the same source, with proper regard to polarity of the rotor leads.

THE COMPUTER COVERS



Location

The Computer Mark 1 has nine covers located as shown in the sketches.

On later instruments, cover 1 has a small cover on the right side for access to the time motor regulator.

Cover 9 is used only when a star shell computer is not supplied.

The Star Shell Computer Mark 1 has three covers: one in front, one in rear, and one over the junction box.

Note that the Computer Mark 1 and the star shell computer do not face in the same direction. The **FRONT** of the star shell computer faces in the direction of the **LEFT** side of the Computer Mark 1. Thus, the front cover of the star shell computer faces the left side of the computer, the rear cover faces the right side of the computer, and the junction box cover faces the rear of the computer.

When repairs or adjustments are to be made inside the computer, some or all of the covers must be removed, but no cover should be kept off the computer unless work is actually in progress under that particular cover.

THE COVER FITTINGS

Studs and nuts are used to hold the covers in place except in special construction where socket head screws are used. The studs are threaded at each end and have an unthreaded section in the middle. They are permanently screwed into the computer frame and protrude through the holes in the covers.

Cap nuts (usually called acorn nuts) are screwed on the studs to secure the covers in place.

A cover washer and a lock washer are always used between the cover and each acorn nut.

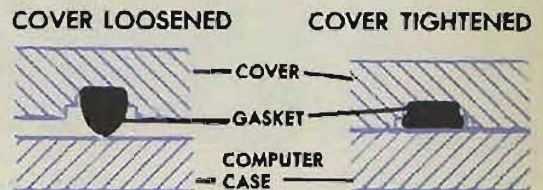
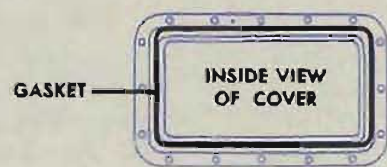
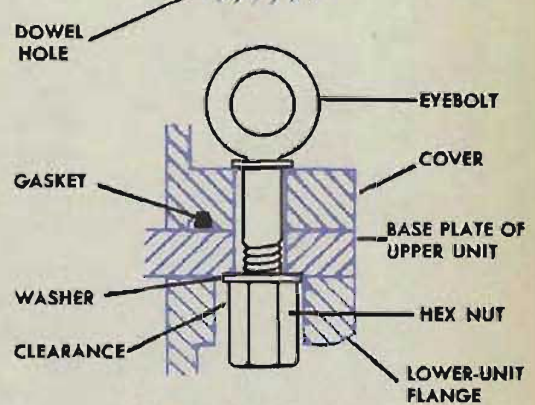
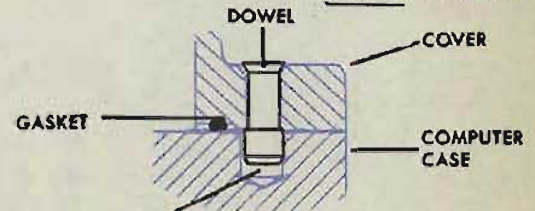
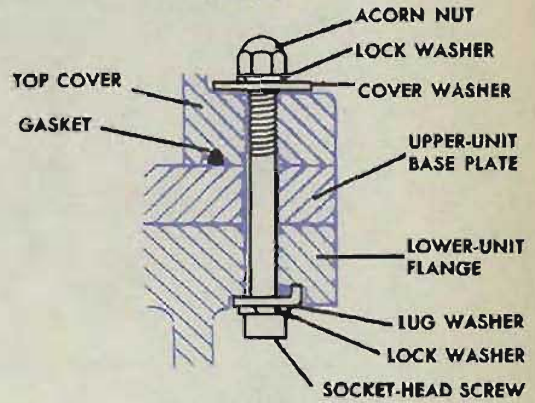
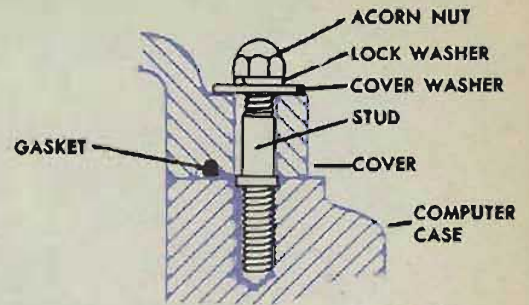
Elongated acorn nuts are used for accessibility instead of regular acorn nuts on the four studs that secure cover 1 in the narrow space between the front and the rear sections of the computer.

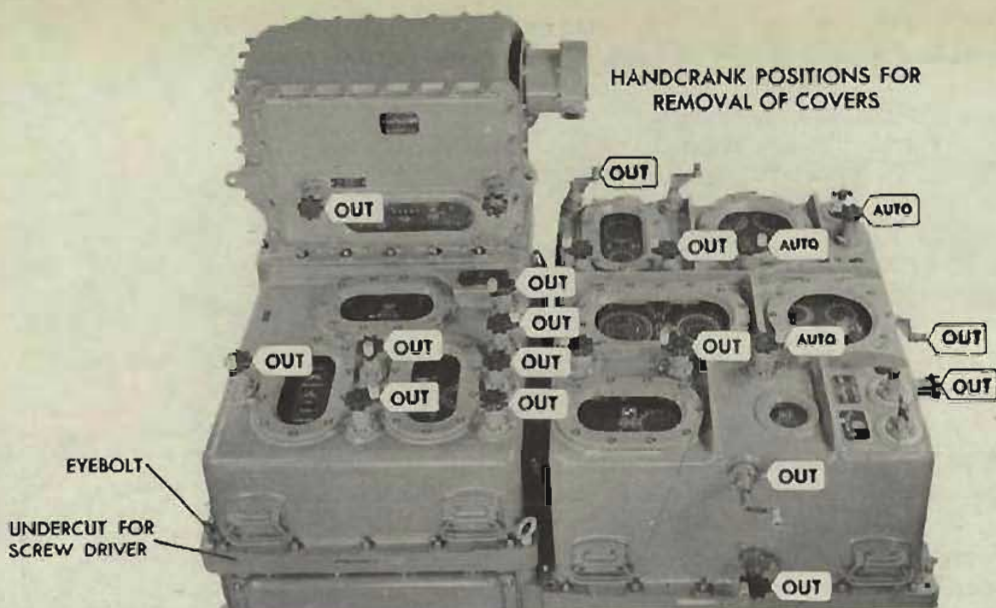
Socket-head screws are used where the sides of the top cover must be secured to a flange of the lower unit. The socket-head screw goes through holes in the lower-unit flange, the upper-unit base plate, and the top-cover flange. A lug washer and a lock washer are used between the head of the screw and the flange, and a cover washer and lock washer are used between the acorn nut and the cover.

Dowels are used to position the covers that have handcranks on them: Covers 1, 2, and 3 on the Computer Mark 1, and the front cover of the star shell computer. A dowel is riveted to a cover and projects from it. The dowels fit snugly into holes in the computer case, thus positioning the covers accurately.

Eyebolts are provided to lift the upper units of the computer off the lower units. There are four of these eyebolts on cover 1 and four on cover 2. They go through the cover and the base plate of the upper unit, and must be removed before removing covers 1 and 2.

A gasket made of rubber or neoprene is cemented into a small groove within a larger groove around the inside edge of each cover. The gasket protrudes about 1/8 inch from the larger groove. When the cover is tightened, the gasket is compressed and expands laterally into the larger groove. Sometimes the gaskets stick to the computer case. Graphite applied to the computer case will help prevent the gasket from sticking.





Removing a cover

Lock all handcranks on the cover at their OUT or AUTO positions. The handcranks come off with the cover.

Remove all the cap nuts and washers around the cover.

Before removing covers 1 and 2, turn the power switch OFF and take out the eyebolts at the corners.

Put a screw driver into each undercut along the edge of the cover near the corners. Pry the cover loose gradually. Use the lifting handles on covers 1 and 2. Keep the cover straight while removing it. Be sure to clear all mechanisms before moving the cover sideways.

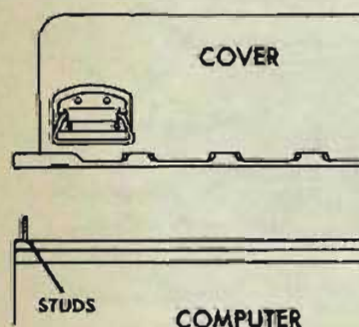
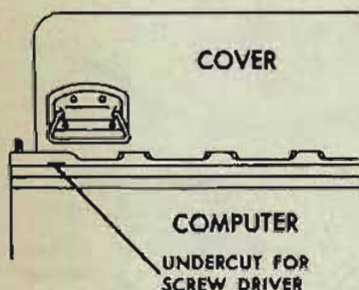
The threads on the studs are sharp and may cause damage to body or clothing. It is advisable to replace the acorn nuts on the studs before working inside the computer.

In order to remove cover 2 when the star shell computer is mounted on it, the star shell computer must be removed.

CAUTION: Cover 1 is heavy and cumbersome. To avoid possible damage to the mechanisms under this cover, four men should handle it during removal.

Replacing a cover

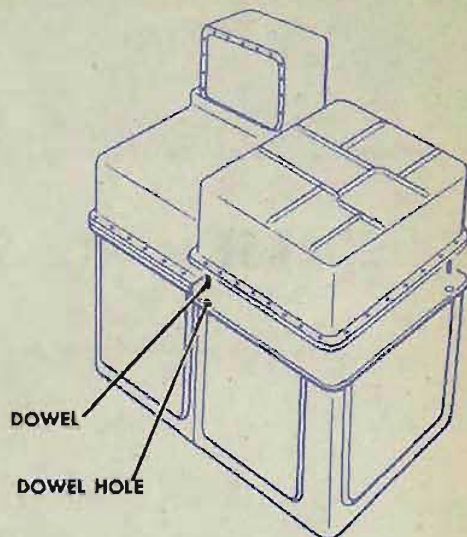
As soon as work is finished inside a unit of the computer, replace the cover of that unit to prevent dirt from getting inside. Before replacing a cover, inspect the cover gasket for damage. If there are breaks in the gasket, take it out, clean the contacting surfaces, and cement a new one in its place. In replacing a cover with handcranks on it, make sure that all the handcranks are locked in their OUT or AUTO positions. Position the cover so that it goes on straight. If there are dowels in the cover, lubricate the dowels with grease and line up the cover so that the dowels slide easily into the holes in the case. Don't try to force the dowels into the holes.



Don't let the covers rest on the stud ends. This may strip the threads of the studs and damage the stud holes. The aluminum chips from the cover may then get into the computer.

When the cover is on, finger-tighten all the cap nuts. Then tighten each nut slightly with a socket wrench. Go around the cover, tightening the nuts evenly until all the nuts are taken up securely. Tightening each nut fully as soon as it is put on a stud may warp the cover.

CAUTION: Some of the handcrank gears are meshed in the OUT position. Make sure these gears are in mesh as the cover is being seated. Check the mesh by turning the handcranks.



BEFORE SEATING COVER:

1. CLEAN OFF THE CONTACTING SURFACES
2. LUBRICATE THE DOWELS WITH GREASE

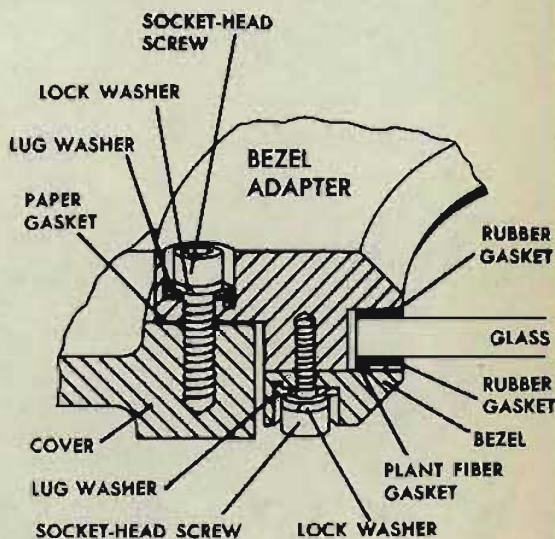
The windows in the covers

The glass in the windows of the covers may have to be replaced occasionally because of discoloration or breakage.

There are two types of windows: those that can be removed from the outside of the cover, and those that can be removed only from the inside of the cover.

Windows attached to outside of a cover

The windows that can be removed from the outside are held between two frames: a bezel on the underside and a bezel adapter on the top. The arrangement of the watertight window gaskets is important. There is a rubber gasket between the bezel adapter and the glass, and a rubber gasket plus a fiber gasket between the glass and the bezel. Socket-head screws hold the assembly together.

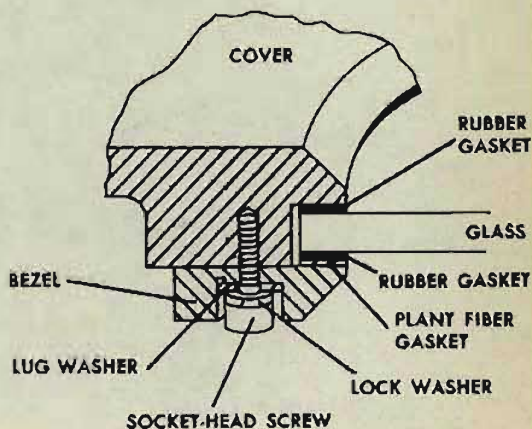


The window assembly is attached to the computer cover with socket-head screws which go through the rim of the bezel adapter and are threaded into the computer cover.

To remove the glass window without removing the cover, it is necessary first to remove the entire assembly from the cover in order to get at the bezel screws on the underside of the assembly.

Windows attached to inside of a cover

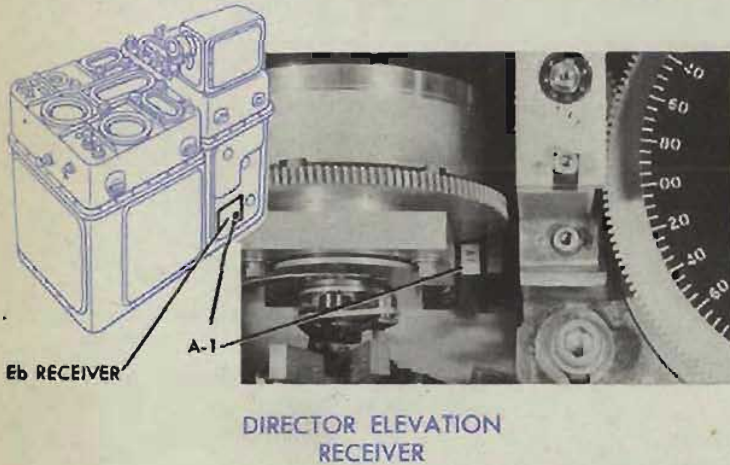
When a window is attached to the *inside* of a cover, the glass can be removed only after the cover in which it is located has been removed from the computer. A bezel usually holds the glass window against the inside of the cover and is secured in place by socket-head screws.



An examination of each type of window assembly will show the order in which to remove the parts and put them together again.

CLAMPS

A-1 COARSE to FINE SYNCHRO—Eb RECEIVER



Location

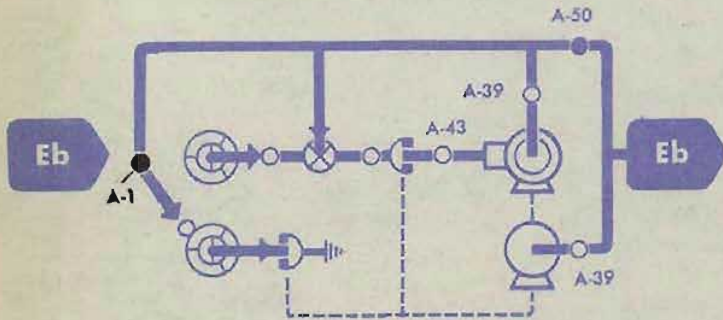
A-1 is under cover 6, on the horizontal worm behind the coarse *Eb* synchro.

Check

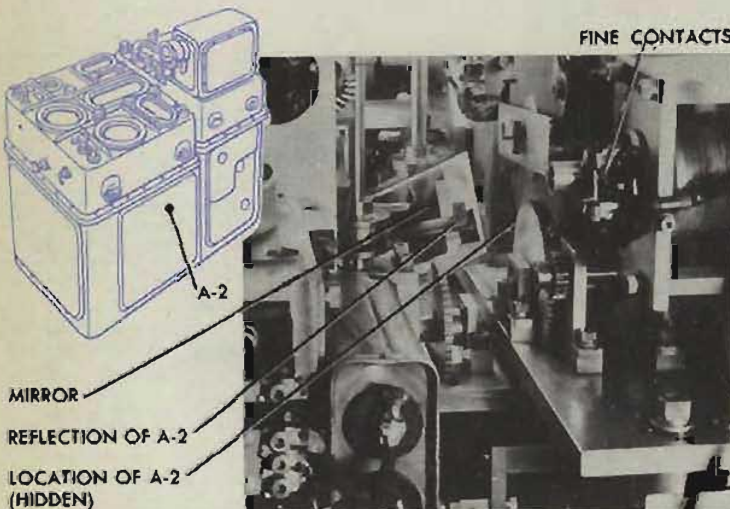
Turn the power ON. Transmit *Eb* from the director. Allow the follow-up to synchronize. The coarse center contact arm on the receiver should be centered between the scissor contacts.

Adjustment

If the contact arm is not centered between the scissor contacts, turn the power OFF, loosen A-1, and turn the worm until the contact is centered. Tighten A-1 and recheck. Readjust A-50.



A-2 COARSE to FINE SYNCHRO—Co RECEIVER



Location

A-2 is under cover 5, on the horizontal worm which meshes with the gear of the coarse *Co* synchro.

The clamp is 3 inches to the rear of the lower right end of the hanger on which a resistor is mounted, and 1/2 inch above the receiver mounting plate. It is visible only with a mirror and a pencil light.

Check

Turn the power ON.
 Transmit *Co* from the gyro compass to the computer.
 Put the *Co* handcrank in the OUT position.
 Allow the follow-up to synchronize.
 Turn the control switch to LOCAL.

The coarse contact arm should be centered between the scissor contacts on the receiver. Since it is difficult to observe the scissor contacts, check them by pushing the fine contact arm to each limit and observing, on the *Br* dials, the amount the follow-up drives each way from the centralized point.

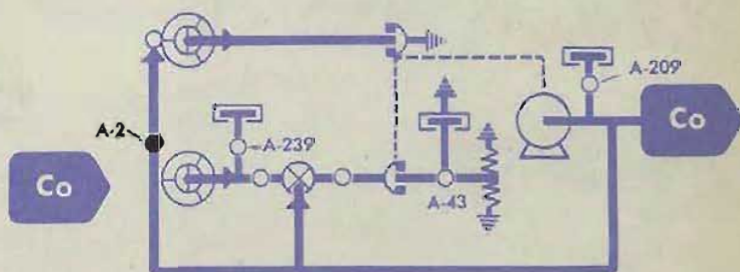


Adjustment

If the follow-up does not drive about the same amount in each direction, approximately 3° on the *Br* dials, loosen A-2. Reach A-2 by inserting a short screw driver between the housing of the differential and the post mounting the scissor arm contacts. Turn the worm until the coarse contact arm is centered. The centered position can be determined only by the trial and error method.

Tighten A-2.
 Readjust A-179.

SHIP COURSE RECEIVER



A-3 Ph COMPUTER to E2 + L LINE

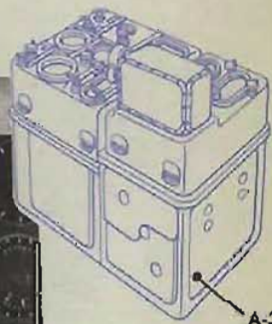
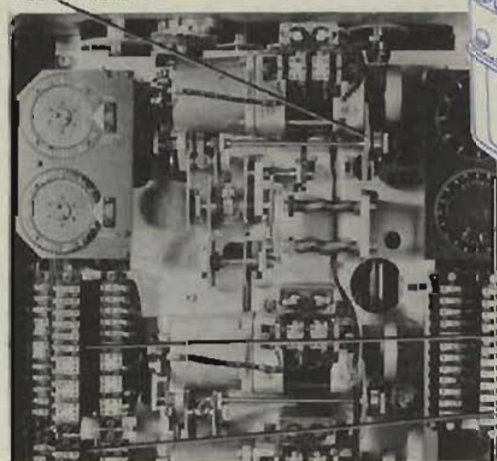
Location

A-3 is under cover 7, below the *Ph* computer. It may be seen by looking down at an angle past the lower end of the coarse *E'g* indicating transmitter.

Check

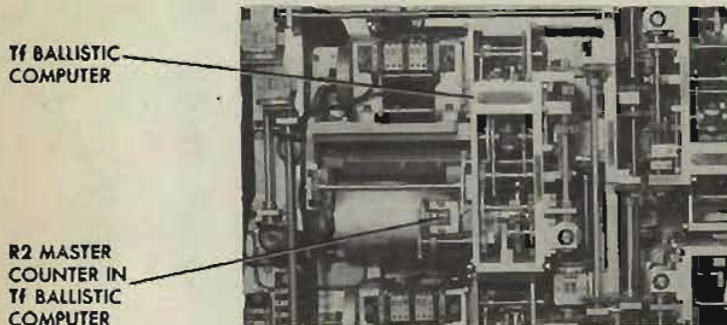
Turn the power OFF.
 Set *Dd* at 0° and wedge the line.
 Set *B'r* and *B'gr* at 90°.

WEDGE HERE



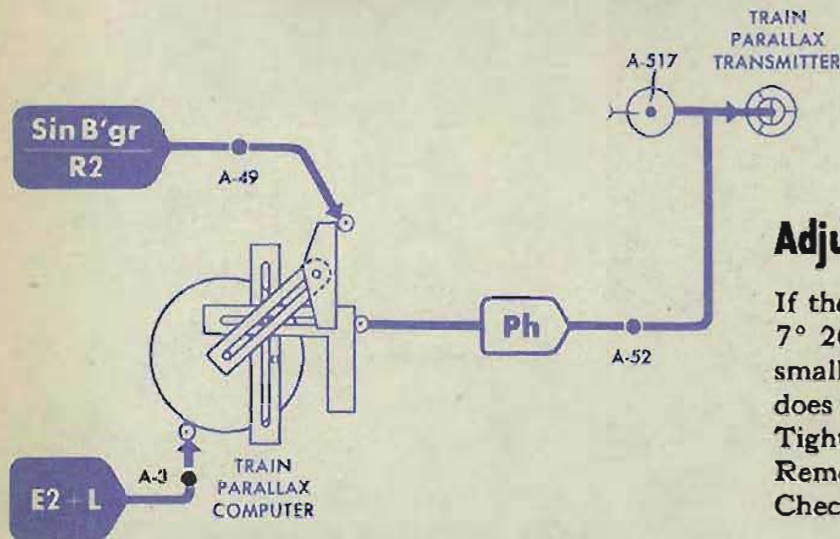
ACCESS TO SEC (E2 + L) CAM

ACCESS TO A-3



Set the R2 master counter at 1560 yards and wedge the line.
 Set E2 at 60°.
 Set L at 2000' on the computer dials.
 The Ph dial should read RIGHT 7° 20'.

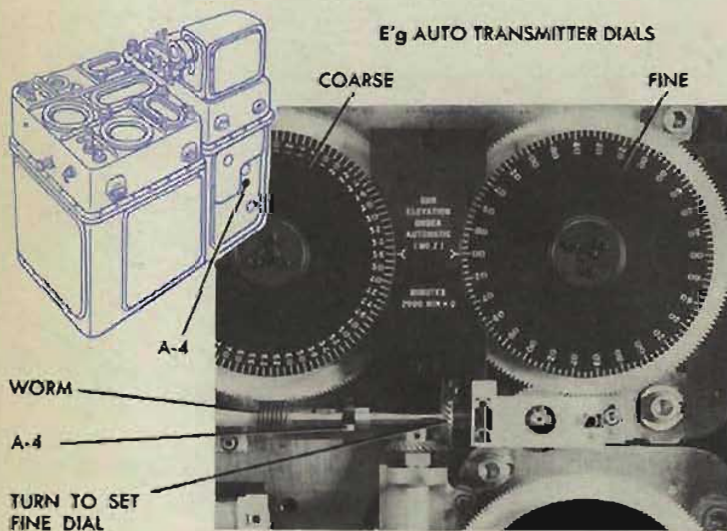
All Mods 0, and some early Mods 1 and 2, have Ph dials graduated in minutes. All others have Ph dials graduated in degrees and minutes.



Adjustment

If the Ph dial does not read RIGHT 7° 20' make A-3 slip-tight. Turn the small gear under A-3 until the dial does read 7° 20'.
 Tighten A-3 and recheck.
 Remove wedges.
 Check A-52.

**A-4 COARSE to FINE SYNCHRO—
 E'g AUTO TRANSMITTER**



Location

A-4 is under cover 6, on the worm beneath the E'g coarse auto transmitter dial.

Check

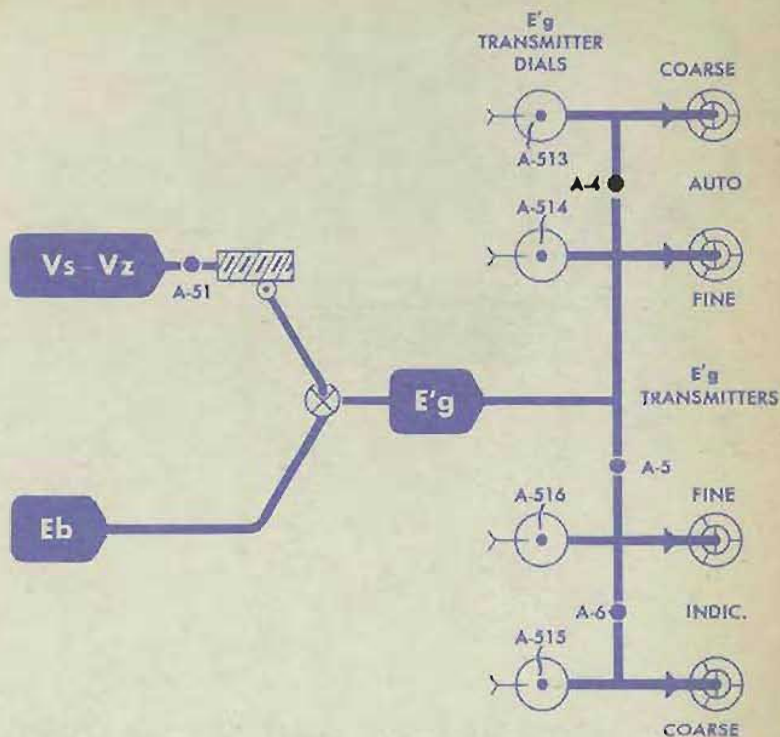
When the coarse dial reads 20, the fine dial should read 00.
 Check A-513 and A-514 before readjusting A-4.

Adjustment

If the dials do not agree, turn the input shaft of the coarse auto transmitter until the coarse dial reads 20. Loosen A-4. Hold the worm to keep the coarse dial at 20 and turn the shaft until the fine dial reads 00. Tighten A-4 and recheck.

Note

There are six different graduations marked 00 on the fine dial. Check that the electrical zero graduation lines up with the 20 graduation on the coarse dial (A-514). Check A-51 and A-5.



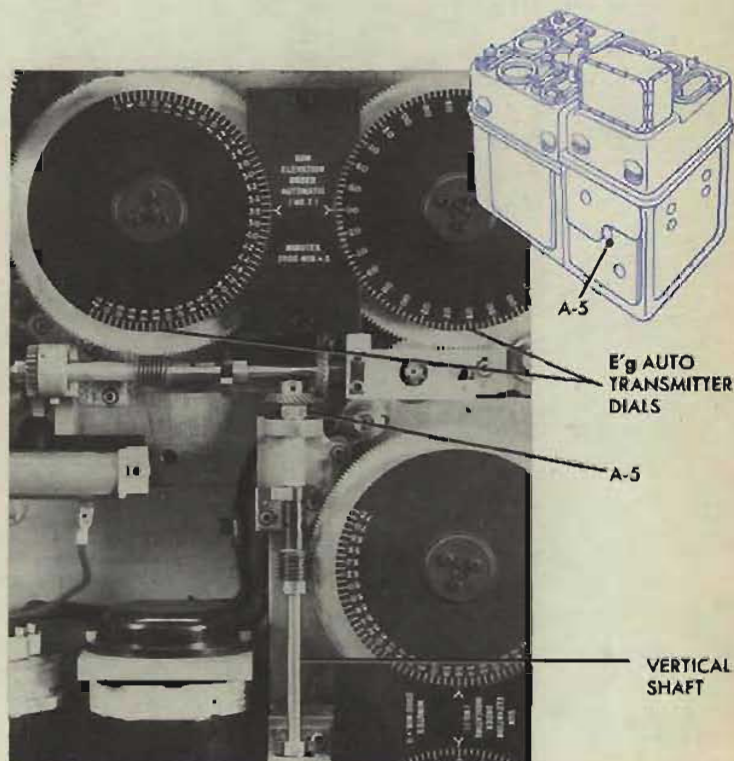
A-5 E'g INDICATING to E'g AUTO TRANSMITTER

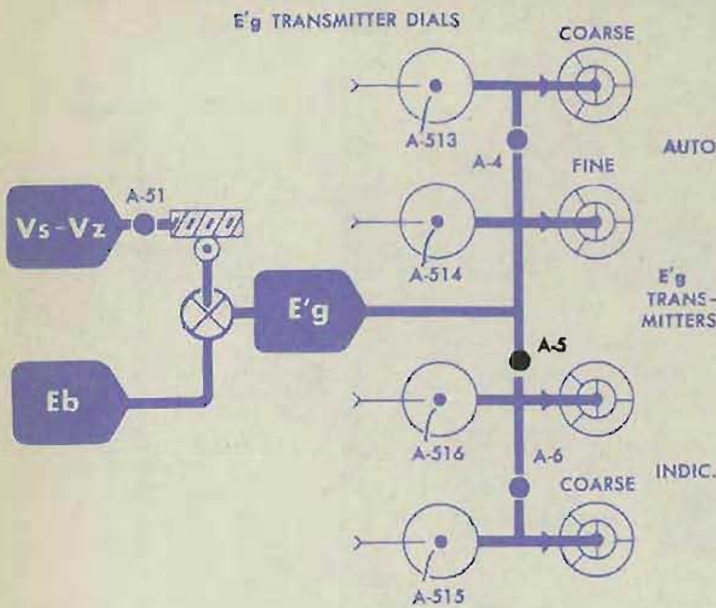
Location

A-5 is under cover 6, on the bevel gear below the E'g auto transmitter dials.

Check

The E'g indicating transmitter dials should read the same value as the E'g auto transmitter dials.





Adjustment

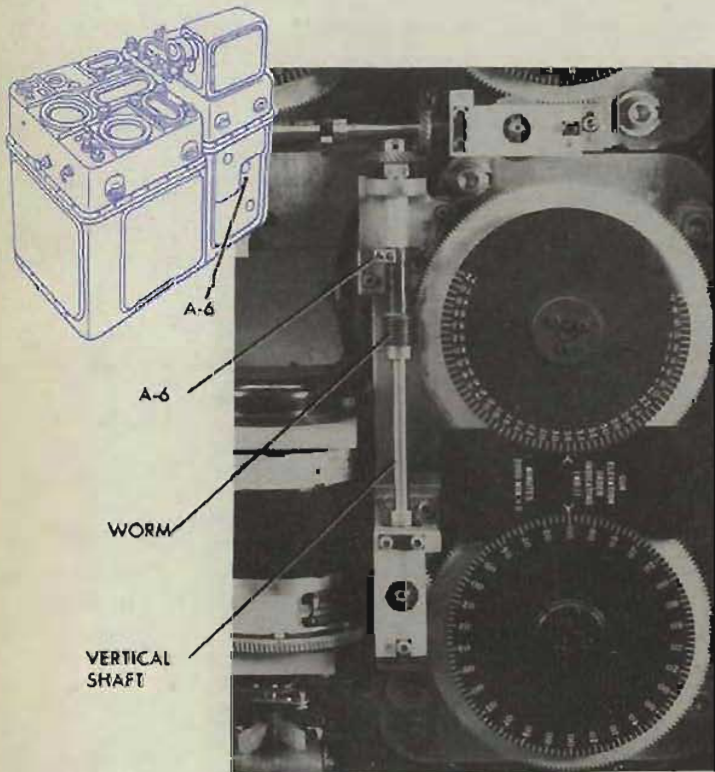
If the dial readings do not agree, loosen clamp A-5.

Turn the vertical shaft below the clamp until the indicating transmitter dials read the same value as the auto transmitter dials.

Tighten A-5 and recheck.

Check A-51 and A-6.

A-6 COARSE to FINE SYNCHRO — E'g INDICATING TRANSMITTER



Location

A-6 is under cover 6, on the worm to the coarse E'g indicating transmitter.

Check

When the coarse dial reads 20, the fine dial should read 00.

Check A-515 and A-516 before readjusting A-6.

Adjustment

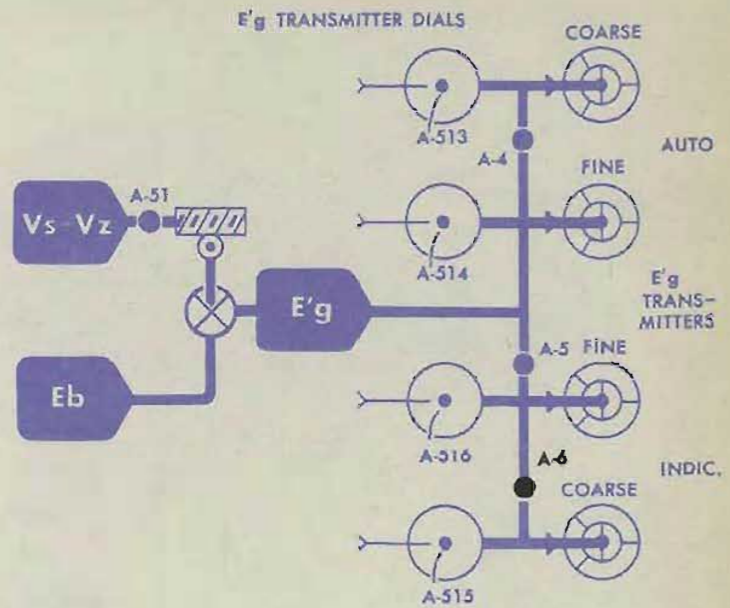
If the dials do not agree, turn the input shaft of the coarse indicating transmitter until the coarse dial reads 20. Loosen A-6. Hold the worm to keep the coarse dial at 20, and turn the shaft until the fine dial reads 00.

Tighten A-6 and recheck.

Note

There are six different graduations marked 00 on the fine dial. Check that the electrical zero graduation lines up with the 20 graduation on the coarse dial (A-516).

Check A-5 and A-51.



A-7 COARSE to FINE SYNCHRO— B'gr AUTO TRANSMITTER

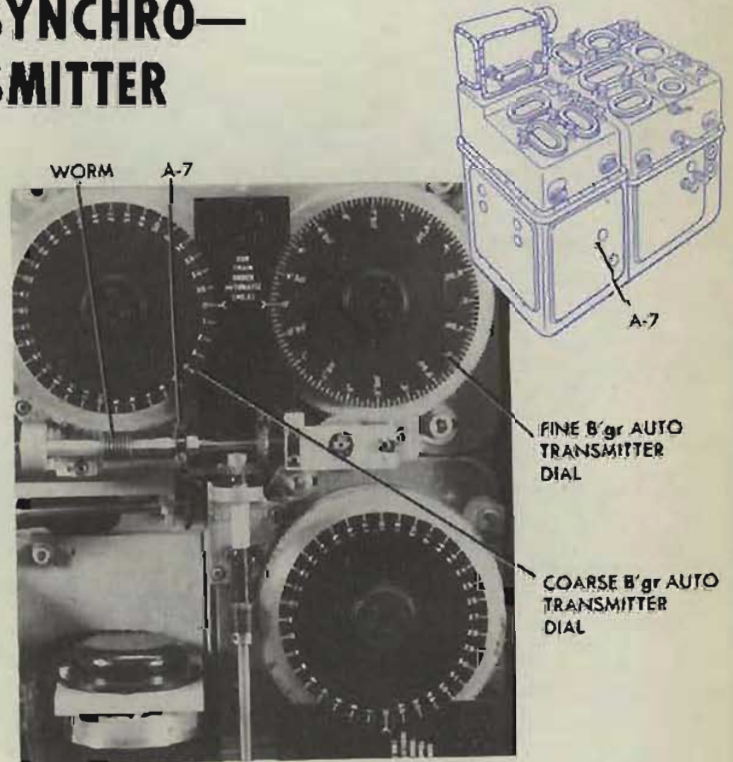
Location

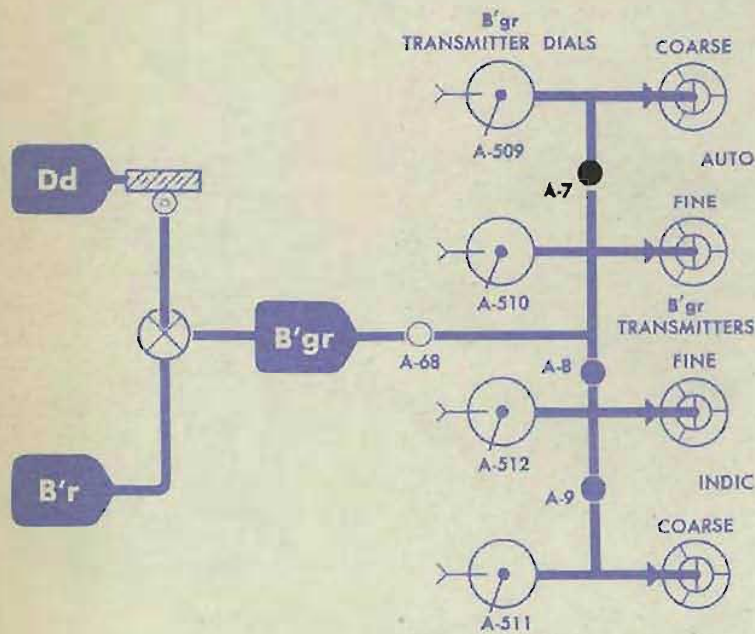
A-7 is on the worm beneath the coarse B'gr auto transmitter dial.

Check

When the coarse dial reads 0°, the fine dial should also read 0°.

Check A-509 and A-510 before readjusting A-7.





Adjustment

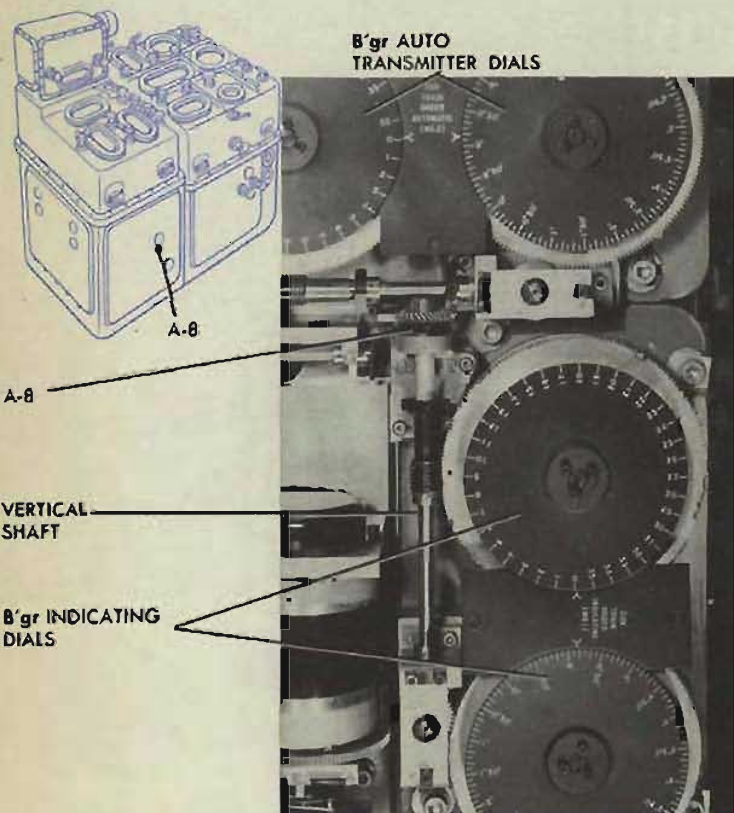
Set the coarse *B'gr* auto dial at 0°.

Loosen A-7.

Hold the worm and turn the shaft until the fine dial reads 0°. Tighten A-7 and recheck.

Check A-68.

A-8 B'gr INDICATING to B'gr AUTO TRANSMITTER



Location

A-8 is under cover 8.

Check

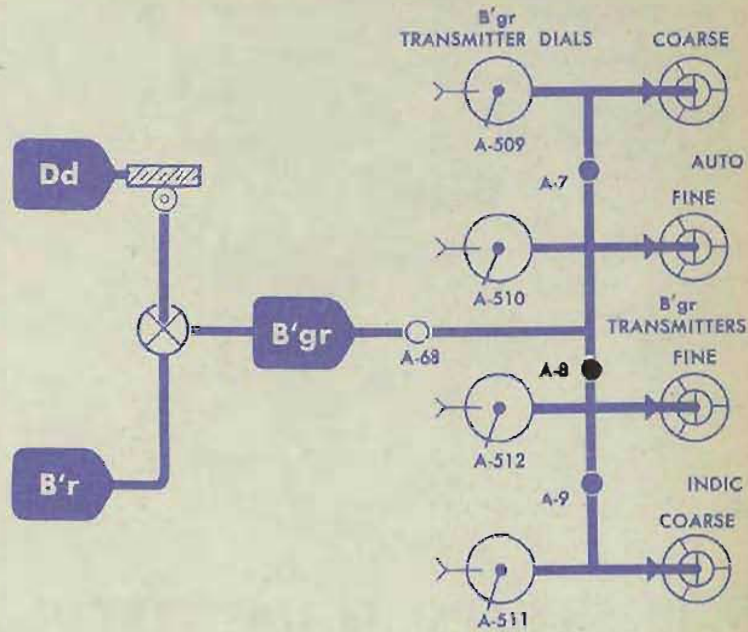
The *B'gr* auto and indicating transmitter dial readings should agree.

Adjustment

If the dial readings do not agree, loosen A-8 and turn the shaft below the clamp until the *B'gr* indicating dials read the same value as the *B'gr* auto dials.

Tighten A-8 and recheck.

Check A-68.



A-9 COARSE to FINE SYNCHRO – *B'gr* INDICATING TRANSMITTER

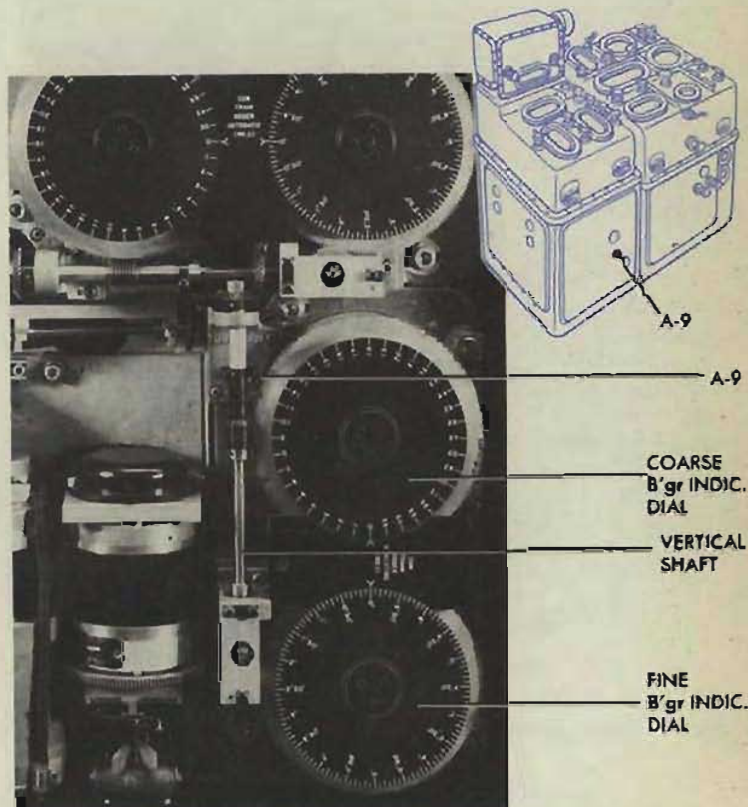
Location

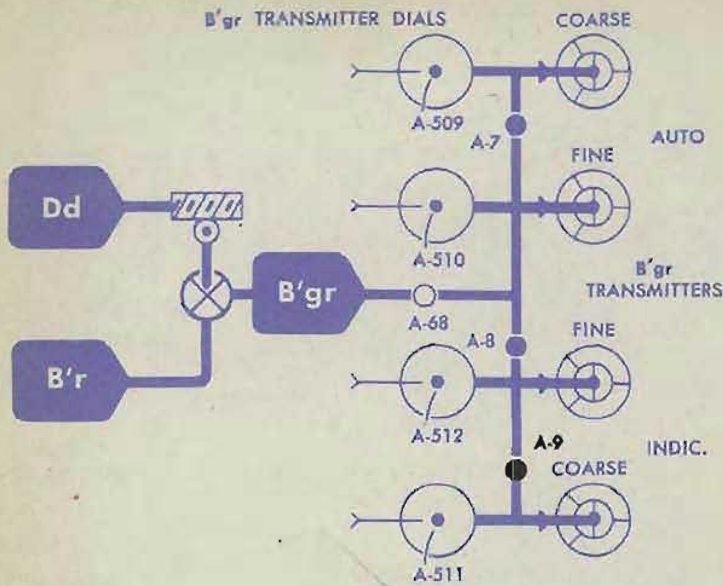
A-9 is under cover 8, on the worm to the coarse *B'gr* indicating transmitter.

Check

When the coarse dial reads 0°, the fine dial should read 0°.

Check A-511 and A-512 before readjusting A-9.





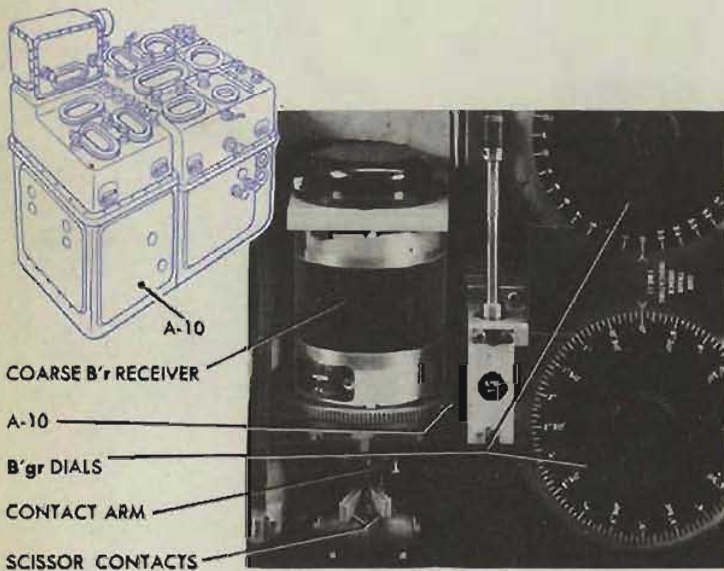
Adjustment

Set the coarse *B'gr* indicating dial at 0°. Loosen A-9. Hold the worm and turn the vertical shaft until the fine dial reads 0°.

Tighten A-9 and recheck.

Check A-8.

A-10 COARSE to FINE SYNCHRO—B'r RECEIVER



Location

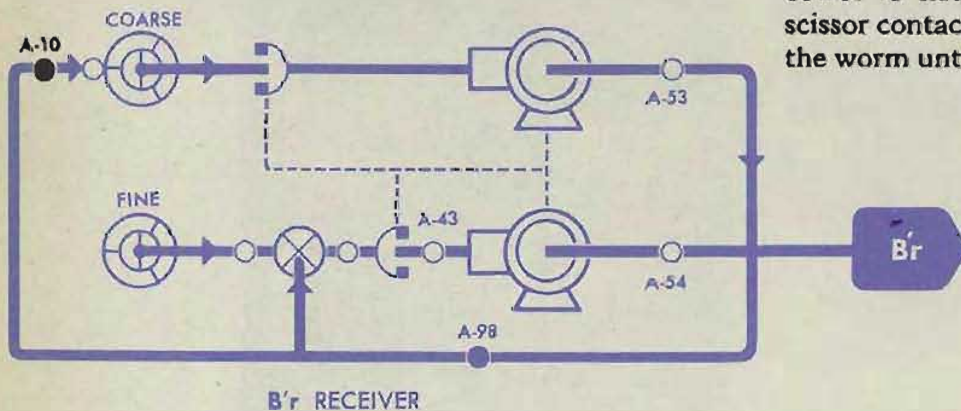
A-10 is under cover 8, on the worm behind the coarse *B'r* receiver.

Check

Turn the power ON. Turn the control switch to SEMI-AUTO. Transmit *B'r* from the director, and allow the follow-up to synchronize. The coarse center contact on the receiver should be centered between the scissor contacts.

Adjustment

If the contact arm on the coarse receiver is not centered between the scissor contacts, loosen A-10 and turn the worm until the arm is centered.



To check the setting, push the fine contact arm to each limit and observe the displacement of the *B'gr* dials. If the contact is centered, the displacement will be equal.

Tighten A-10 and recheck.

Check A-98.

A-11 ASSEMBLY CLAMPS

Location

Three assembly clamps numbered A-11 are located under cover 7. One is located on each of the three servo motor output shafts: *Dd*, *jB'r*, and *Vz*.

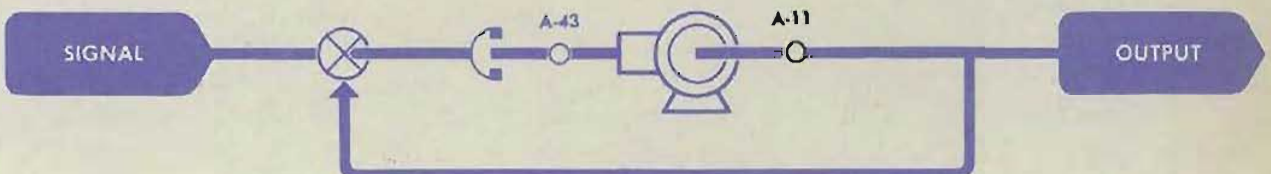
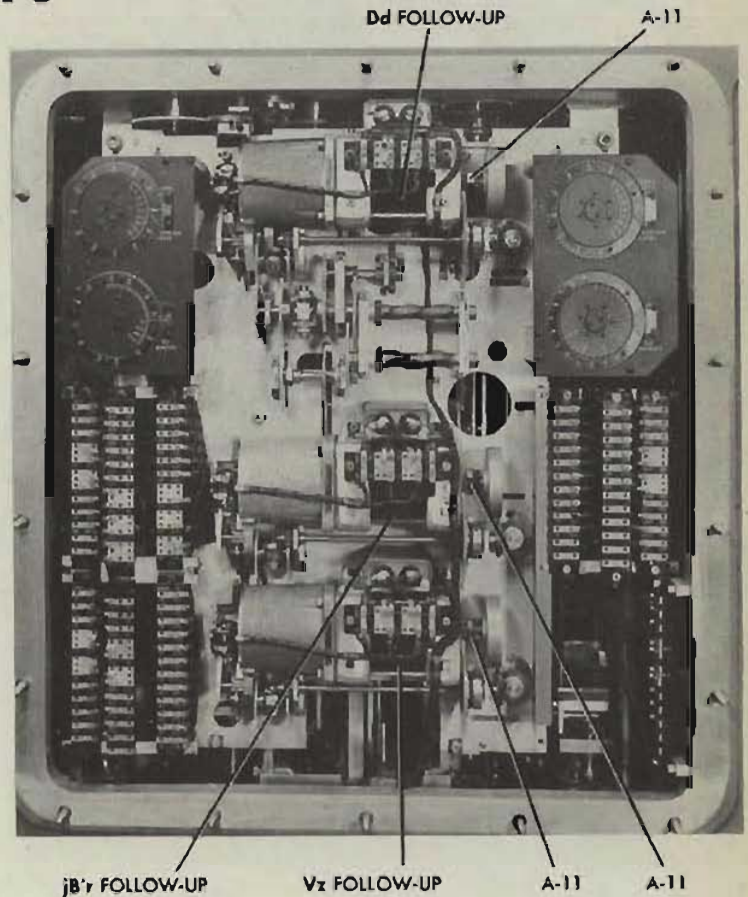
Check

If an A-11 clamp is loose, the servo may run away; that is, it may drive without limitation.

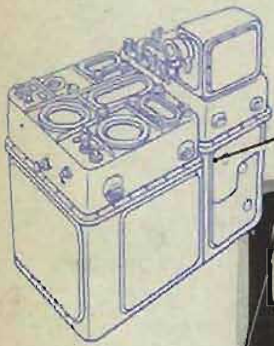
It will not drive the associated gear train because of slippage of the gear on which A-11 is mounted.

Adjustment

Tighten A-11.

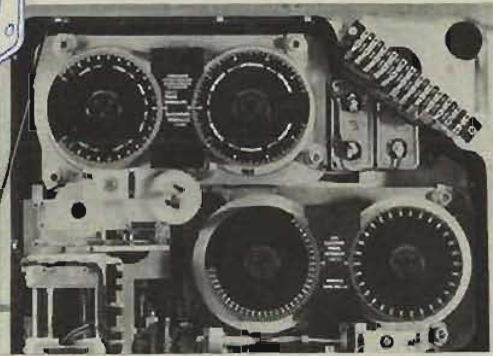


A-12 FRICTION BRAKES to SYNC E HANDCRANK

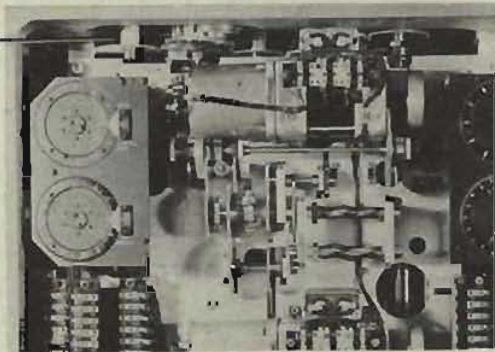


A-12

ACCESS TO A-12



BRAKES AND CAM SHAFT (HIDDEN)



Location

A-12 is under cover 6, about 12 inches in, and is reached through an access at the upper front of the *Ph* transmitter. The brakes and cam shaft can be seen by removing cover 7 and looking into the computer directly above the *L* dials.

Check

Put the sync *E* handcrank **IN** and compare the position of the rear cam, nearest the back of the instrument, with the corresponding sketch of the cam, shown below. Do the same with the sync *E* handcrank in the **CENTER**, then in the **OUT** position.

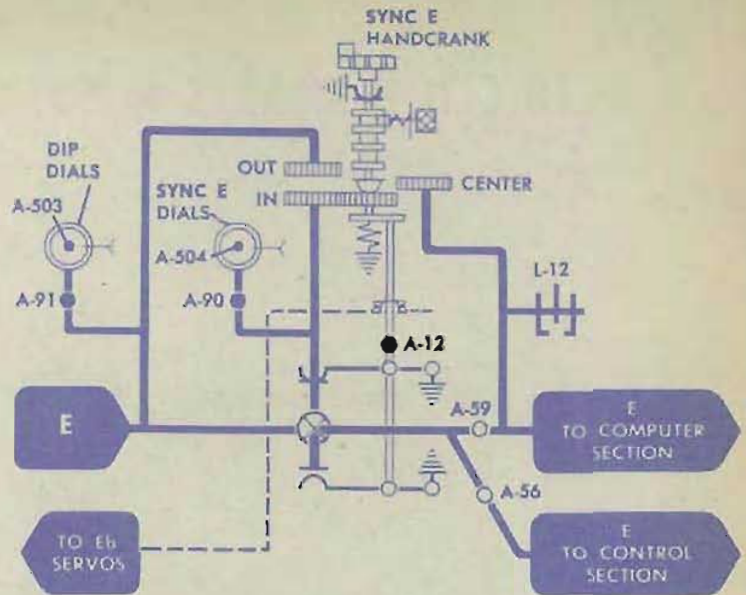
With the sync *E* handcrank **IN**, the rear friction brake should be released and the front friction brake applied. With the handcrank in the **CENTER** and **OUT** positions, the rear brake should be applied, and the front brake released.



RELATIVE POSITIONS OF REAR ROLLER AND CAM

Adjustment

If the cams are adjusted incorrectly so that the brakes are applied and released improperly, put the sync *E* handcrank in the **CENTER** position. Make A-12 slip-tight. Using a gear pusher made of soft material such as aluminum, turn the bevel gear below A-12 until the rear cam is in the proper position shown in the sketch. Tighten A-12 and check the positions of the cam against the sketches when the sync *E* handcrank is at the **IN** and the **OUT** positions.



A-13 SYNCHRONIZING THE $V_f + P_e$ FOLLOW-UP

Location

A-13 is under cover 4, in the $V_f + P_e$ ballistic computer.

Check

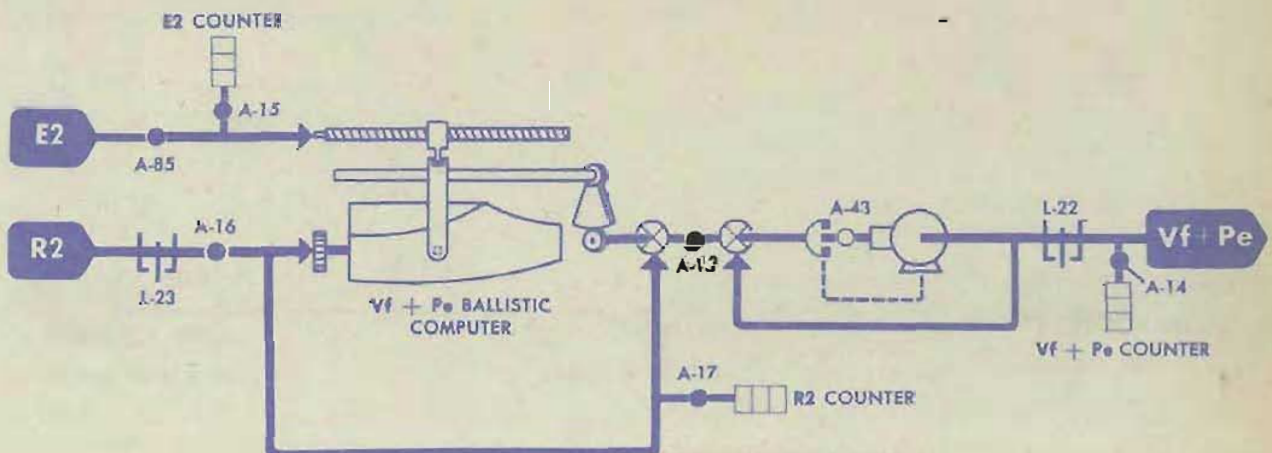
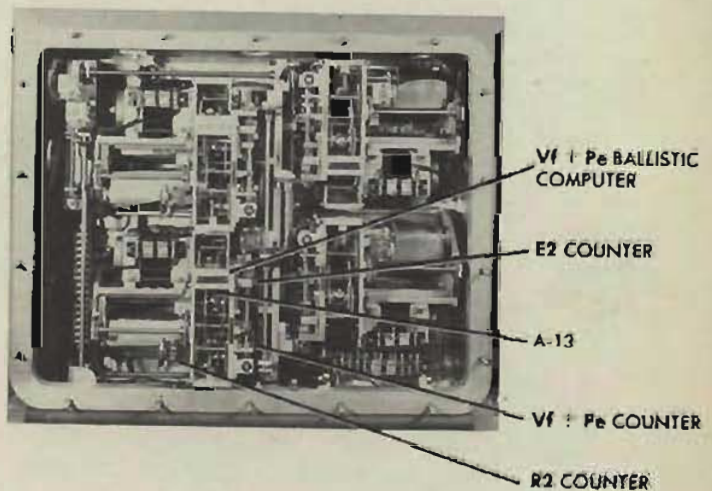
Refer to the N.I.O. final test sheet for the particular unit being checked.

Turn the power ON.

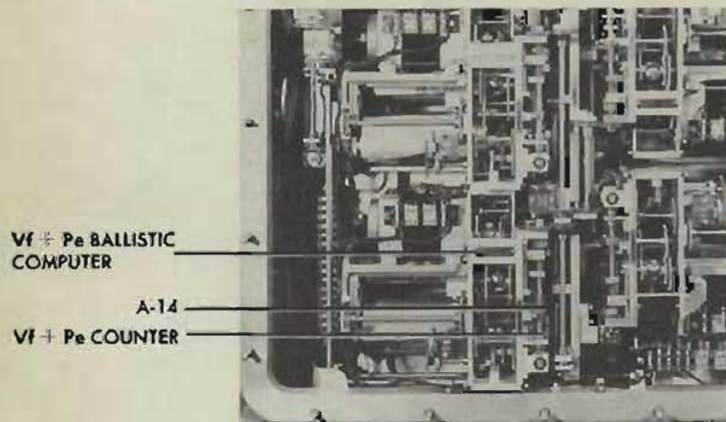
Set *E2* and *R2* at values given on the N.I.O. final test sheet.

Read the $V_f + P_e$ unit counter and note any variation from the corresponding values recorded on the test sheet.

If the $V_f + P_e$ value is *consistently less* or *consistently greater* than the recorded value, A-13 is in error and should be readjusted.



A-14 Vf + Pe COUNTER to L-22



Adjustment

Loosen A-13. Turn the gear on which it is mounted to synchronize the follow-up at the correct value of $Vf + Pe$. Tighten A-13.

Refer to the N.I.O. final test sheets and run the complete test of the $Vf + Pe$ ballistic computer.

If necessary, A-13 may be readjusted slightly to improve the readings.

Location

A-14 and L-22 are under cover 4, in the $Vf + Pe$ ballistic computer.

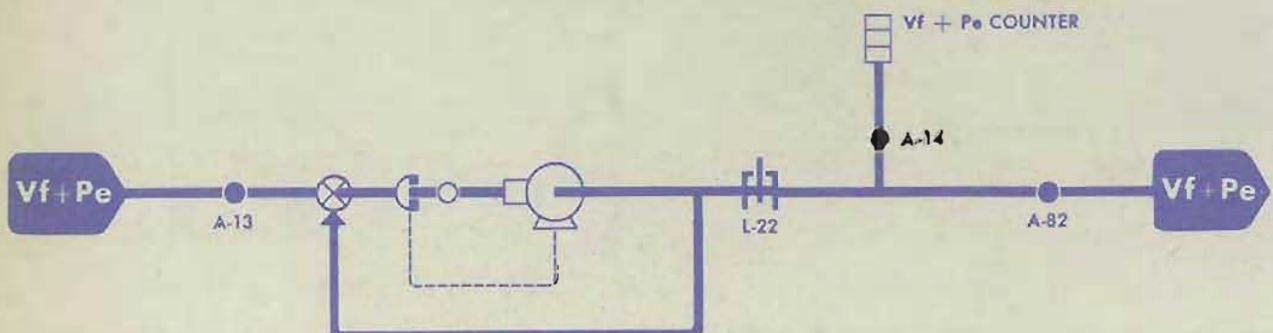
Check

Turn the power OFF.
Turn the $Vf + Pe$ ballistic computer output gearing from limit to limit.

The $Vf + Pe$ counter should read 0' at the lower limit, and 2500' at the upper limit. (On Mods 8 and 12, the limits are 0' and 1800'.)

Adjustment

Loosen A-14.
Slip the counter to the correct reading.
Tighten A-14 and recheck.
Check A-13 and A-82.



A-15 E2 COUNTER to Vf + Pe BALLISTIC COMPUTER

Location

A-15 is under cover 4, in the Vf + Pe ballistic computer.

Check

Turn the power OFF.

Set E2 and R2 at the values listed on the setting rod legend plate.

Loosen A-209 on the Vf + Pe follow-up damper. Push the damper to the end of the shaft.

Insert a 3/16-inch setting rod through the casting, follower arm, and cam. If it is necessary to change the E2 input to insert the setting rod, A-15 is upset and should be readjusted.

Adjustment

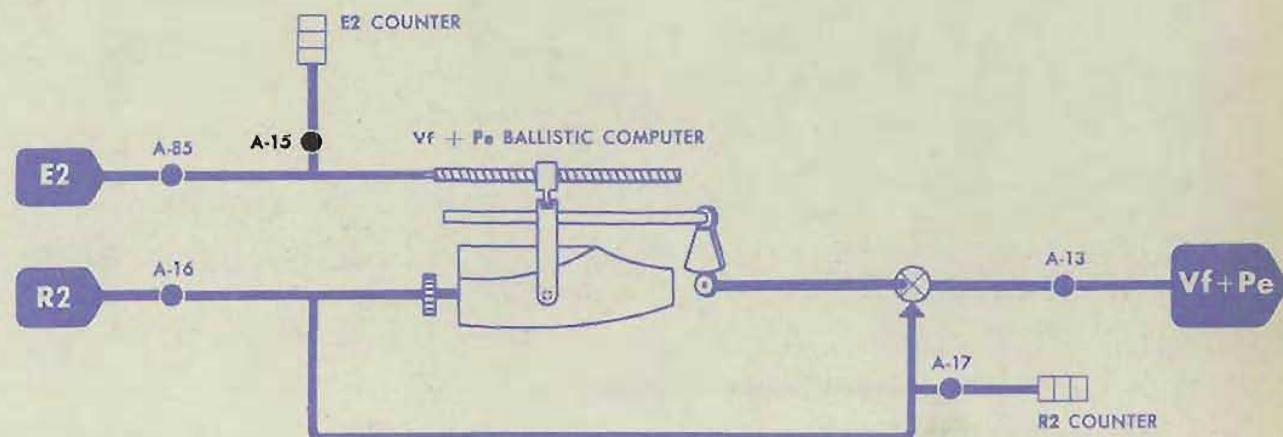
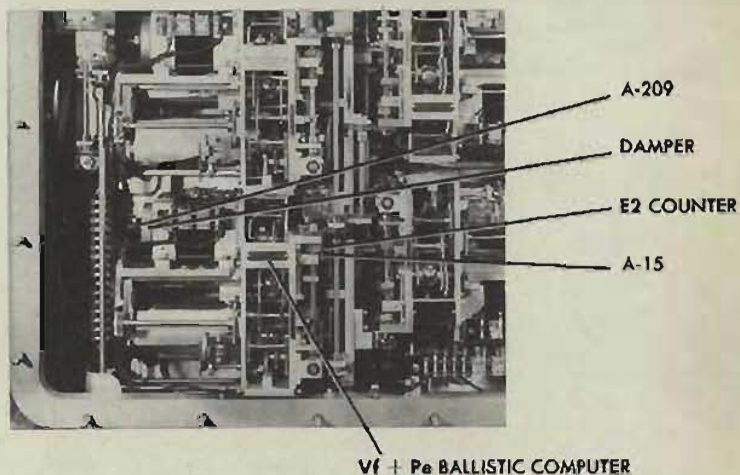
With the setting rod inserted, loosen A-15. Turn the E2 counter until it reads the value specified on the legend plate. Tighten A-15 and recheck.

Remove the setting rod.

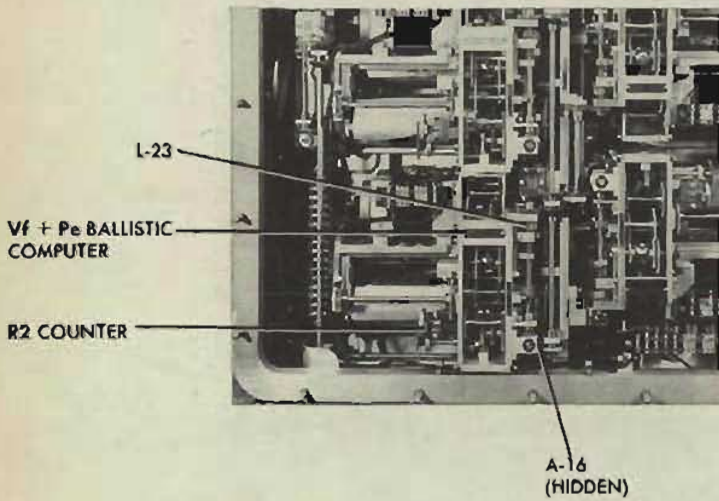
Replace the damper on the follow-up and tighten A-209.

Check that E2 can be varied from 0° to 90°.

Check A-13 and A-85.



A-16 R2 COUNTER to L-23



Location

A-16 and L-23 are under cover 4, in the $V_f + P_e$ ballistic computer.

Check

Turn the power OFF.

Loosen A-75.

Turn the R2 input to the $V_f + P_e$ ballistic computer from limit to limit.

The R2 counter should read 300 yards at the lower limit and 18,200 yards at the upper limit on Mods 3, 4, 6, 7, 10, and 13. On Mods 0, 1, 2, and 9, the limits are 1,300 and 18,200 yards. On Mods 8 and 12, the limits are 300 and 20,200 yards.

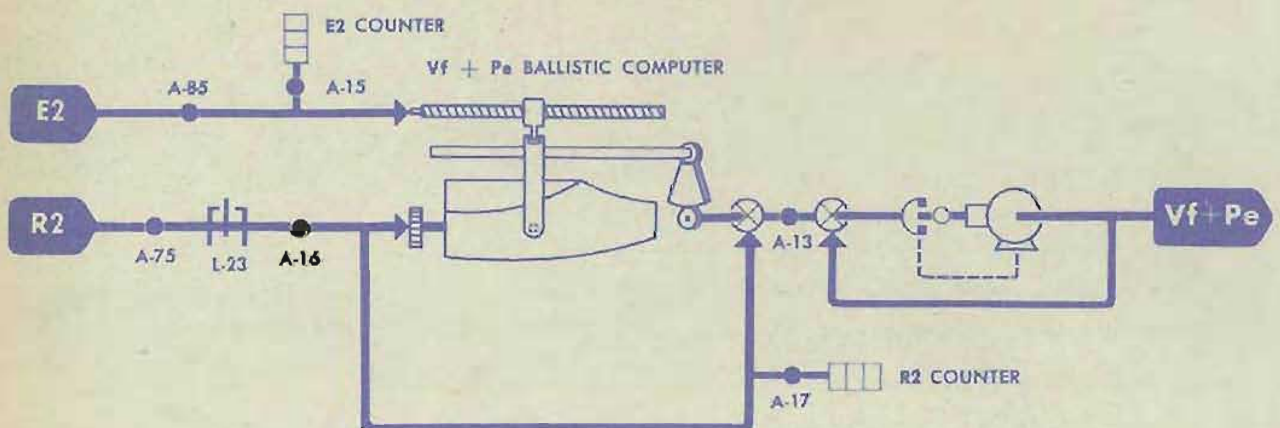
Adjustment

If the R2 counter does not read the proper values, loosen A-16.

Turn the R2 counter gearing until the limits are correct. Tighten A-16 and recheck.

Readjust A-75.

Check A-13.



A-17 R2 COUNTER to Vf + Pe BALLISTIC COMPUTER

Location

A-17 is under cover 4, in the Vf + Pe ballistic computer.

Check

Turn the power OFF.

Set E2 and R2 at the values listed on the legend plate.

Loosen A-209 on the Vf + Pe follow-up damper, and push the damper to the end of the shaft.

Insert a 3/16-inch setting rod through the casting, follower arm, and cam. If it is necessary to change the R2 input to insert the setting rod, A-17 is upset and should be readjusted.

Adjustment

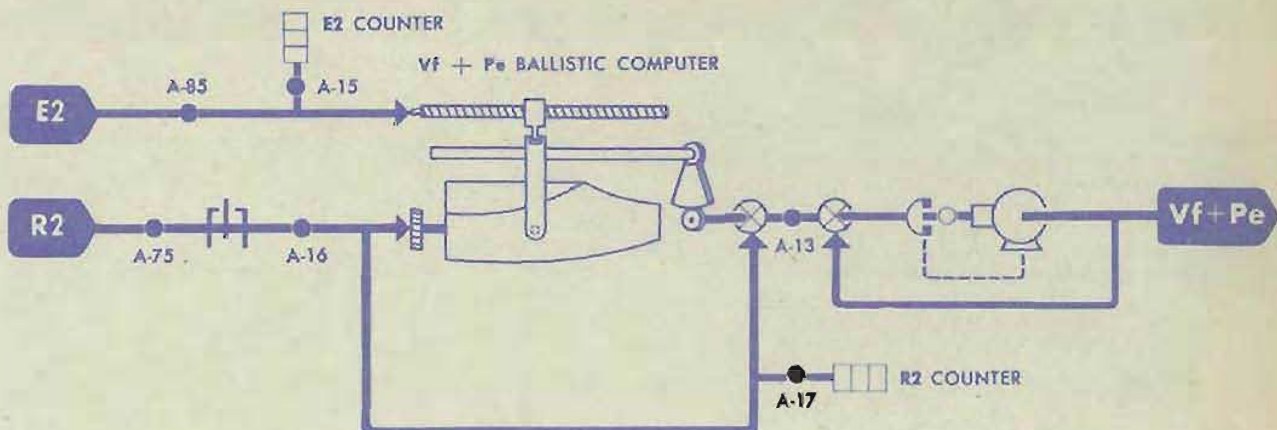
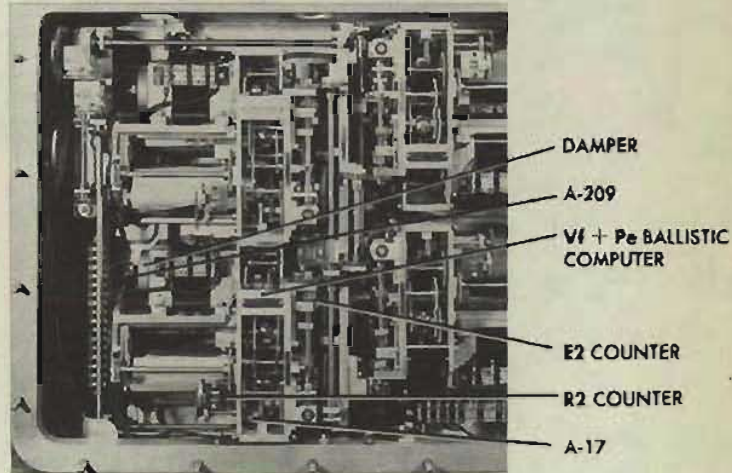
With the setting rod inserted, loosen A-17. Turn the R2 counter gearing until the counter reads the value specified on the legend plate.

Tighten A-17 and recheck.

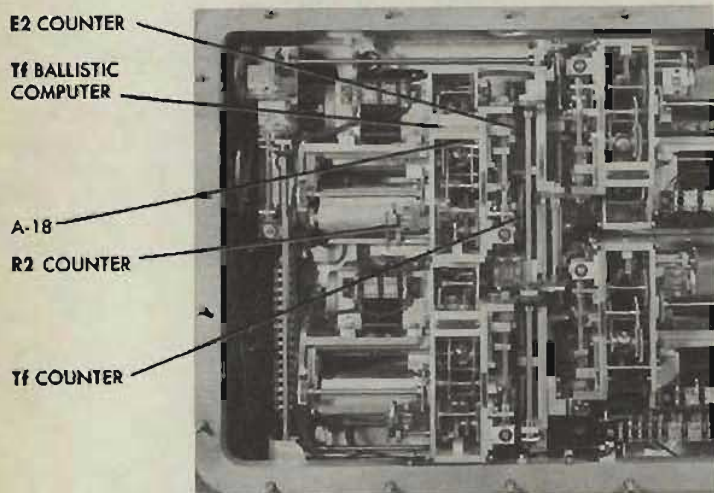
Remove the setting rod.

Replace the damper on the follow-up and tighten A-209.

Check A-16, A-75, and A-13.



A-18 SYNCHRONIZING THE Tf FOLLOW-UP



Location

A-18 is under cover 4, in the *Tf* ballistic computer.

Check

Refer to the N.I.O. final test sheet for the particular unit being checked.

Turn the power ON.

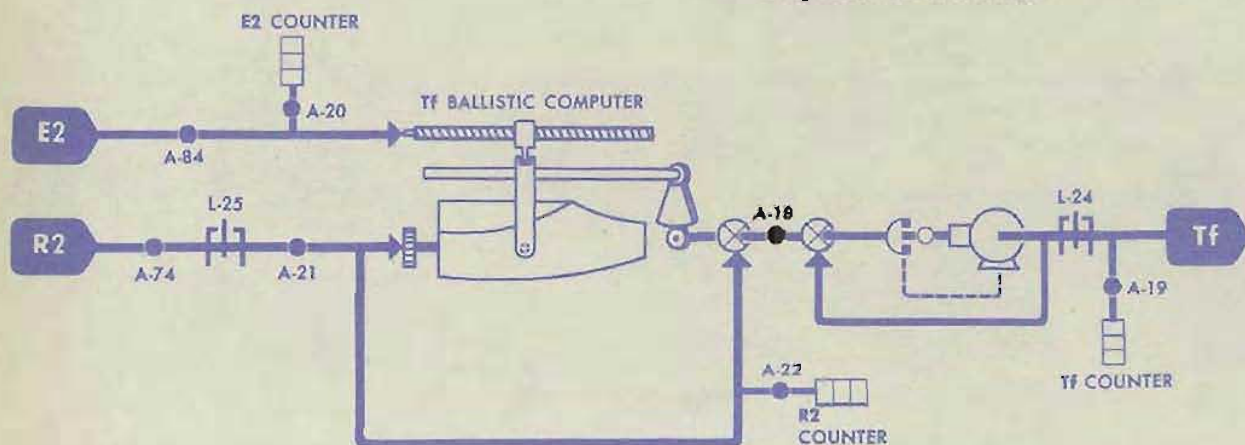
Set E2 and R2 at the values given on the N.I.O. final test sheet.

Read the *Tf* unit counter and note any variation from the corresponding values recorded on the test sheet. If the *Tf* value is *consistently less* or *consistently greater* than the recorded value, A-18 is in error and should be readjusted.

Adjustment

Loosen A-18. Turn the gear on which it is mounted to synchronize the follow-up at the correct value of *Tf*. Tighten A-18.

Refer to the N.I.O. acceptance test sheets and run the complete test of the *Tf* ballistic computer. If necessary, A-18 may be readjusted slightly to improve the readings.



A-19 Tf COUNTER to L-24

Location

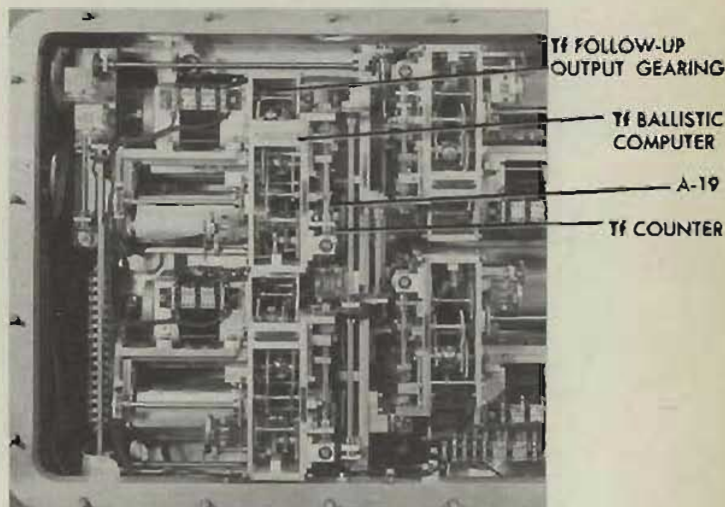
A-19 and L-24 are under cover 4, in the *Tf* ballistic computer.

Check

Turn the power OFF.

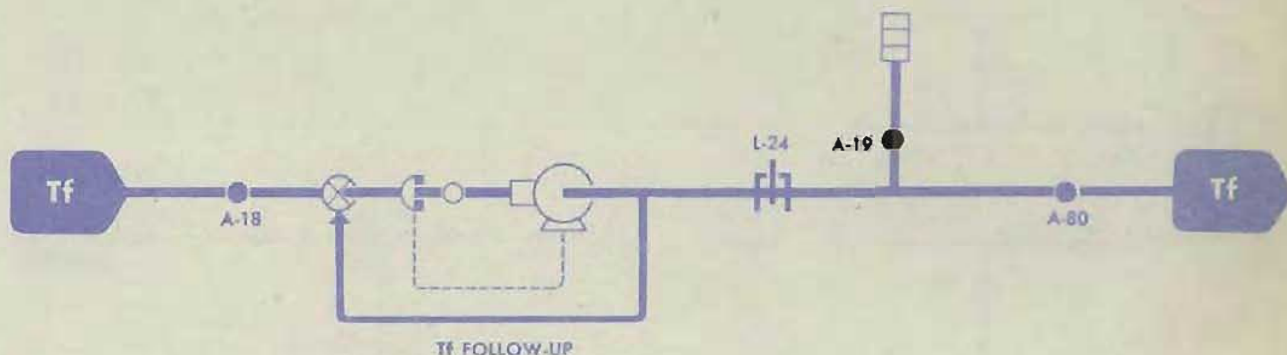
Turn the *Tf* ballistic computer output gearing from limit to limit.

The *Tf* counter should read 0.60 second at the lower limit and 60.60 seconds at the upper limit, on Mods 3, 4, 6, 7, 10, and 13. On Mods 0, 1, 2, and 9, the limits are 1.80 and 61.80 seconds. On Mods 8 and 12, the limits are 0.60 to 50.6 seconds.

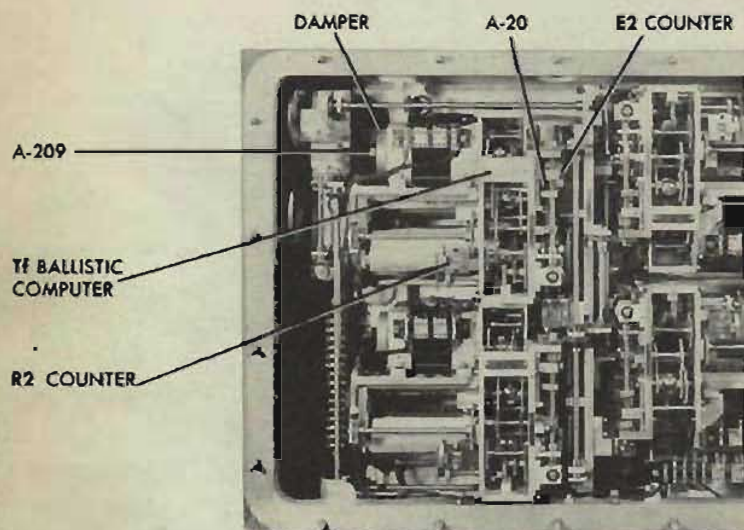


Adjustment

Loosen A-19. Slip the counter to the correct reading. Tighten A-19 and re-check. Check A-18 and A-80.



A-20 E2 COUNTER to Tf BALLISTIC COMPUTER



Location

A-20 is under cover 4, in the Tf ballistic computer.

Check

Turn the power OFF.

Set E2 and R2 at the values listed on the legend plate. Loosen A-209 on the Tf follow-up damper, and push the damper to the end of the shaft.

Insert a 3/16-inch setting rod through the casting, the follower arm, and the cam. If it is necessary to change the E2 input to insert the rod, A-20 is up-set and should be readjusted.

Adjustment

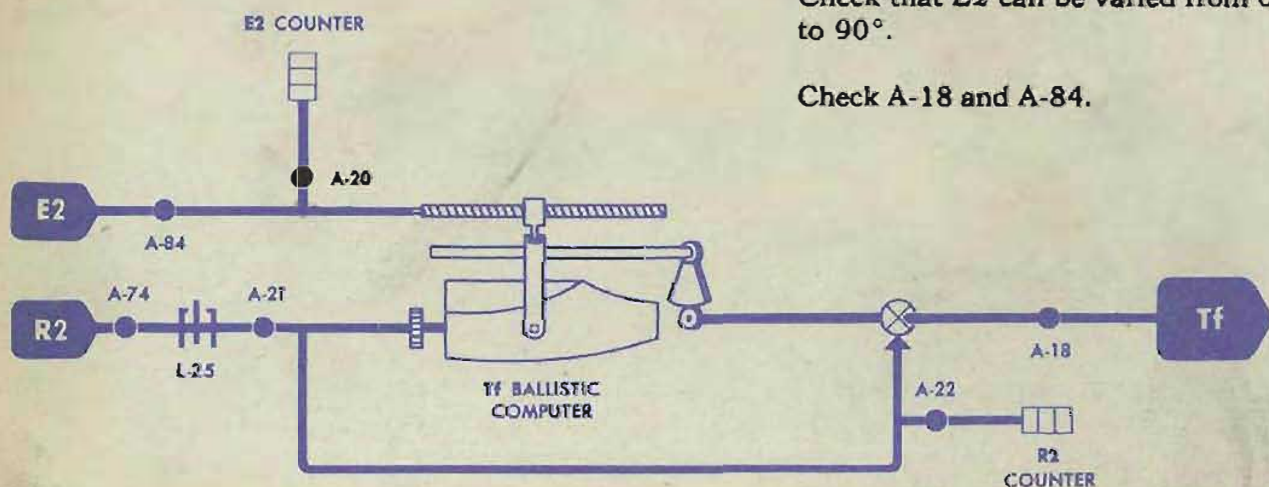
With the setting rod inserted, loosen A-20. Turn the E2 counter until it reads the value specified on the legend plate. Tighten A-20 and recheck.

Remove the setting rod.

Replace the damper on the follow-up shaft, and tighten A-209.

Check that E2 can be varied from 0° to 90°.

Check A-18 and A-84.



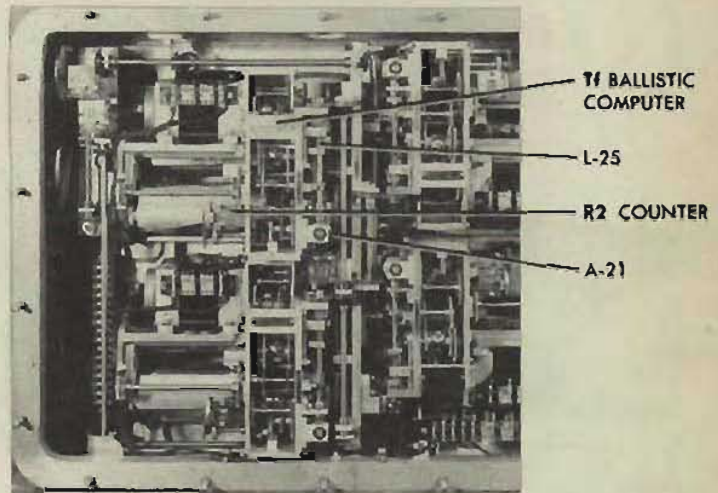
A-21 R2 COUNTER to L-25

Location

A-21 and L-25 are under cover 4, in the Tf ballistic computer.

Check

Turn the power OFF.
 Loosen A-74, and readjust later.
 Turn the R2 input to the Tf ballistic computer from limit to limit.
 The R2 counter should read 300 yards at the lower limit and 18,200 yards at the upper limit, on Mods 3, 4, 6, 7, 10, and 13. On Mods 0, 1, 2, and 9, the limits are 1,300 and 18,200 yards. On Mods 8 and 12, the limits are 300 and 20,200 yards.



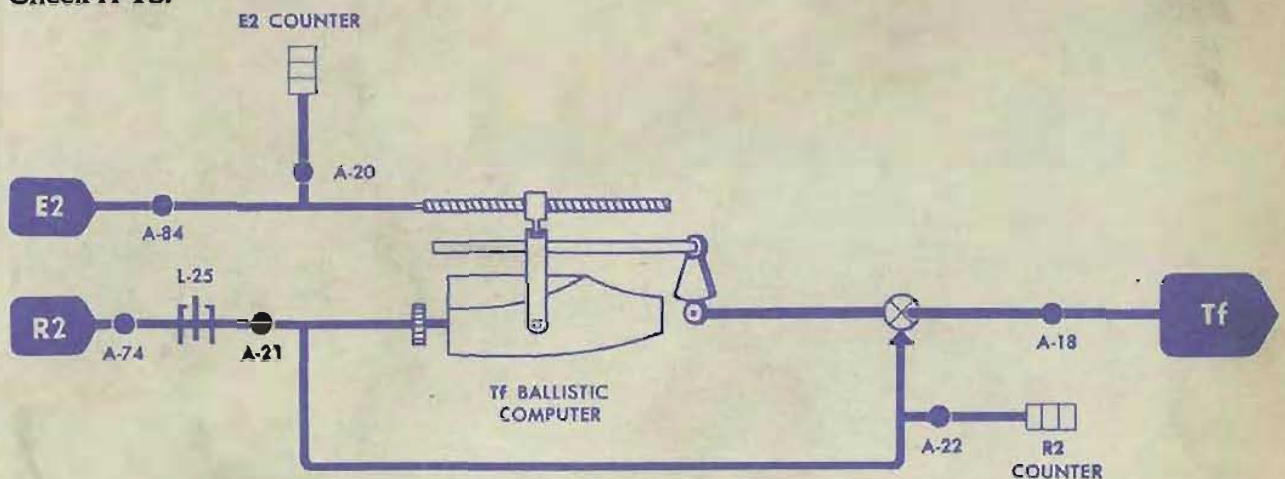
Adjustment

If the R2 counter does not read the proper value, loosen A-21.

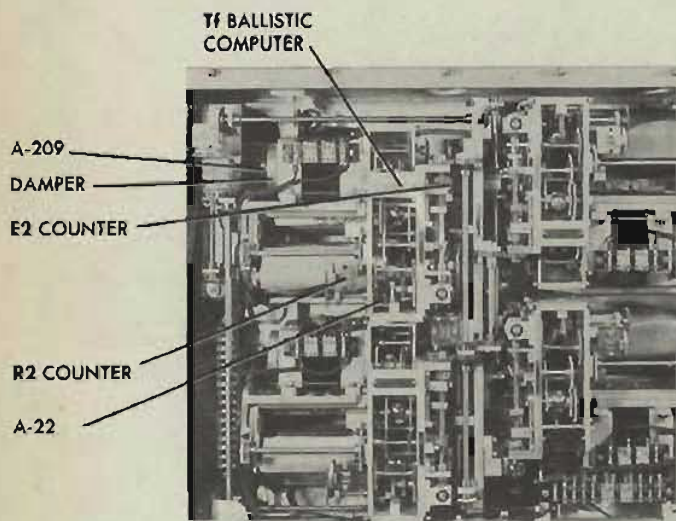
Turn the R2 counter gearing until the limits are correct. Tighten A-21 and recheck.

Readjust A-74.

Check A-18.



A-22 R2 COUNTER to Tf BALLISTIC COMPUTER



Location

A-22 is under cover 4, in the *Tf* ballistic computer.

Check

Turn the power OFF.

Set *E2* and *R2* at the values listed on the legend plate.

Loosen A-209 on the *Tf* follow-up damper, and push the damper to the end of the shaft.

Insert a 3/16-inch setting rod through the casting, the follower arm, and the cam. If it is necessary to change the *R2* input to insert the rod, A-22 is up-set, and should be readjusted.

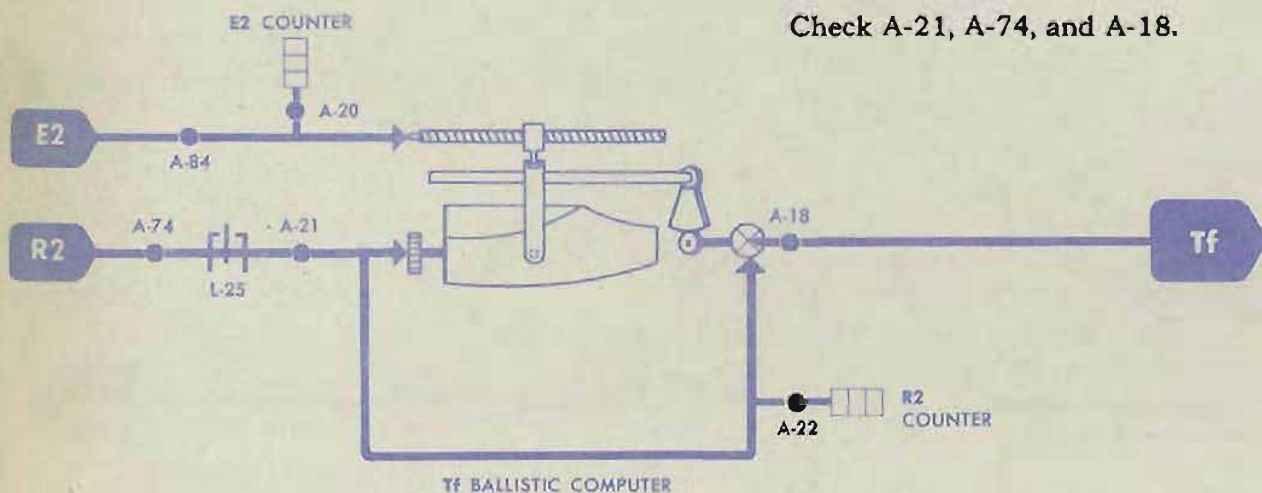
Adjustment

With the setting rod inserted, loosen A-22. Turn the *R2* counter until it reads the value specified on the legend plate. Tighten A-22 and recheck.

Remove the setting rod.

Replace the damper on the follow-up, and tighten A-209.

Check A-21, A-74, and A-18.



A-28 DECK TILT COMPONENT SOLVER to L DIALS

Location

A-28 is under cover 6 directly behind the *L* dials.

Check

Remove leads 1B and 1BB from the *Dd* follow-up. Turn the follow-up output gearing to set *Dd* at 0° , and wedge the line.

Turn the power ON. Turn the control switch to LOCAL.

Set *L* at 2000'.

Use the generated bearing crank in the OUT position to set *B'r* at 0° , as read on the *B'gr* dial.

Set up a dial indicator to measure motion of the $L \cos 2B'r$ rack of the deck tilt component solver. This rack, which moves vertically, is accessible under cover 7, below the *Vz* follow-up, about four inches in.

Observe the indicator while turning *B'r* from 0° to 180° . The indicator reading should not change during the rotation of the vector gear. In most cases, however, it is inadvisable to re-adjust A-28 unless the total indicator movement exceeds 0.002 inch.

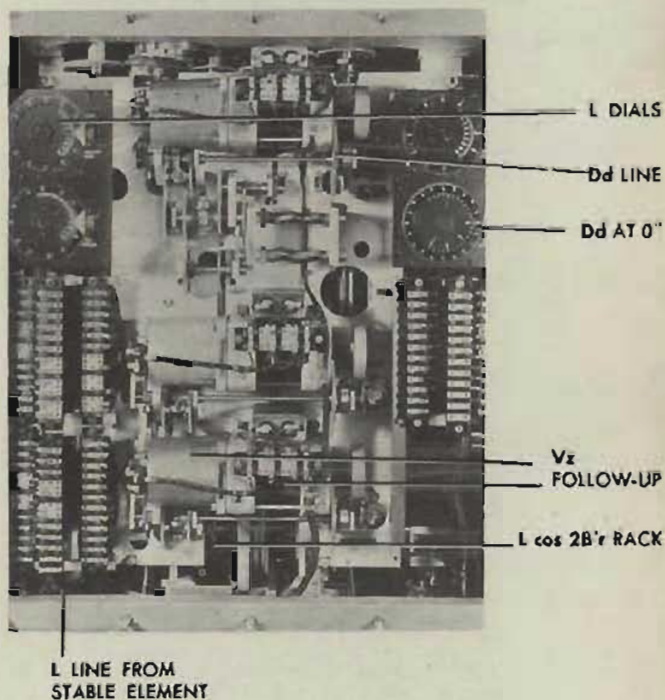
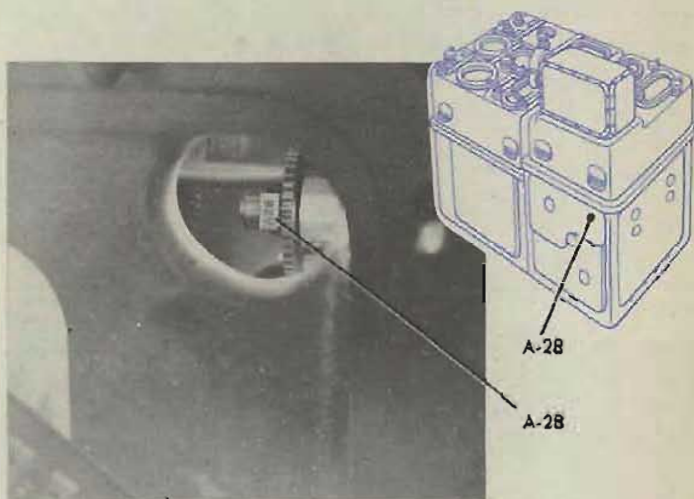
Adjustment

Make A-28 slip tight.

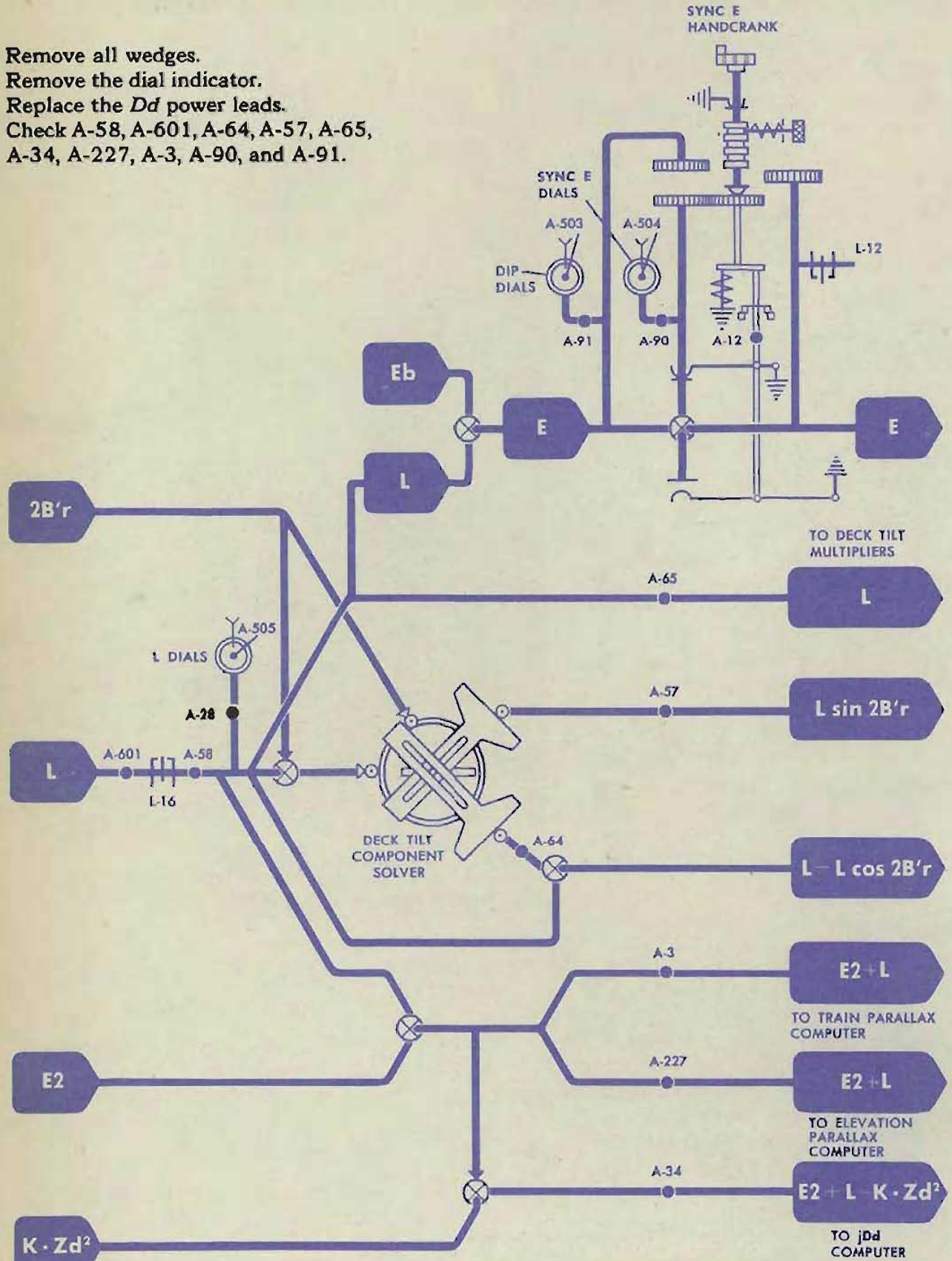
Set *B'r* at 45° and note the reading of the dial indicator.

Turn *B'r* from 45° to 0° . Then turn the *L* shaft line until the indicator has its original reading. Hold the *L* shaft line and bring the computer *L* dials to 2000' by turning the square mounting plate behind the dials. Tighten A-28 and recheck.

Turn the the power OFF.



Remove all wedges.
 Remove the dial indicator.
 Replace the *Dd* power leads.
 Check A-58, A-601, A-64, A-57, A-65,
 A-34, A-227, A-3, A-90, and A-91.



A-29 Vz DIALS to L-34

Location

A-29 is under cover 6, on the shaft to the Vz dials. It is reached through an access hole in the upper right corner. L-34 can be seen under cover 7, near the output of the Vz follow-up. It is mounted in a vertical position with the upper limit of Vz, +1860', at the top, and the lower limit of Vz, -2940', at the bottom.

Check

Turn the power OFF.

Turn the Vz follow-up output gearing until the lower limit of L-34 is reached.

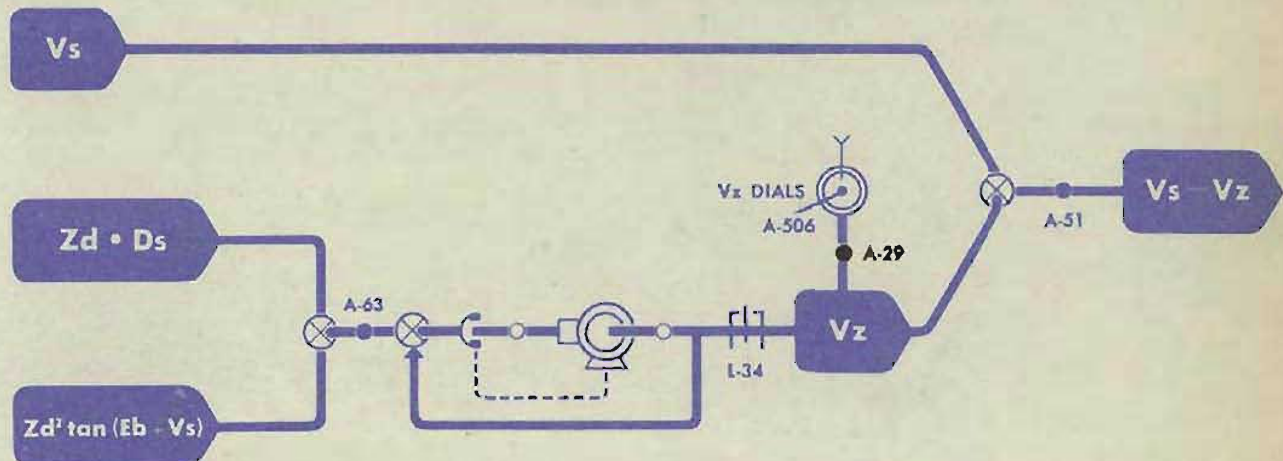
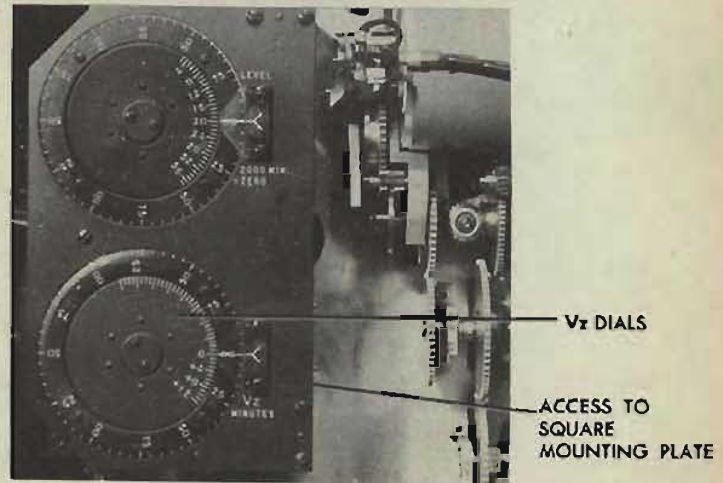
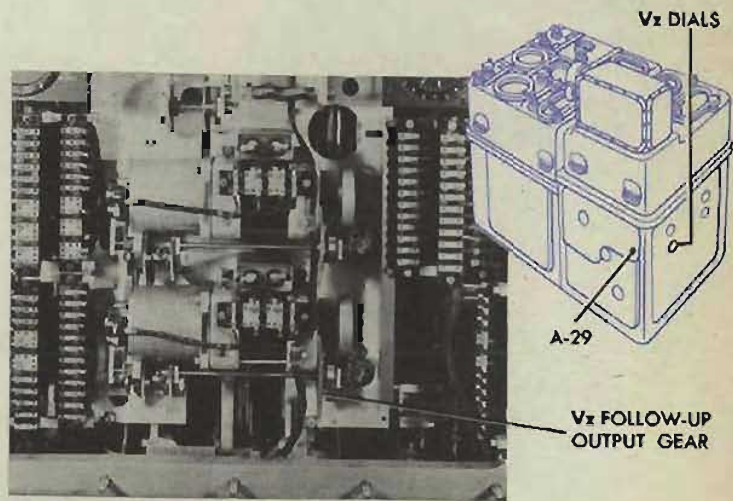
The Vz dials should read -2940'.

Turn the follow-up output gearing until the upper limit of L-34 is reached.

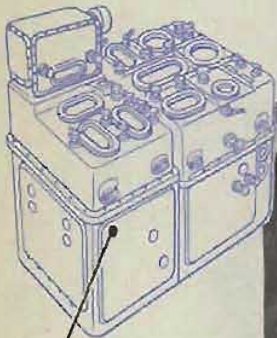
The Vz dials should read +1860'.

Adjustment

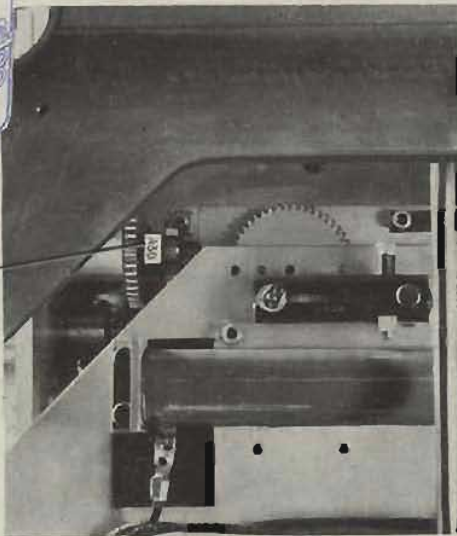
If the limits are not correct, make A-29 slip-tight. Hold the stop at one limit and slip the dials to the proper reading by turning the square mounting plate behind the dials. Tighten A-29 and recheck at the other limit. Check A-63 and A-51.



A-30 Zd DIALS to L-17



A-30



Zd DIAL

Location

A-30 is under cover 8, directly behind the *Zd* dials.

L-17 is located under cover 7, on the rear deck plate about 12 inches in. The upper limit is toward the left of the computer.

Check

Loosen A-603.

Turn the *Zd* shaft line to run L-17 from one limit to the other.

The *Zd* dials should read 480' at the lower limit and 3520' at the upper limit.

IMPORTANT

If either limit cannot be reached, it is possible that A-112, A-35, A-113, or A-111 is in error.

Determine which clamp is in error and loosen it.

Adjustment

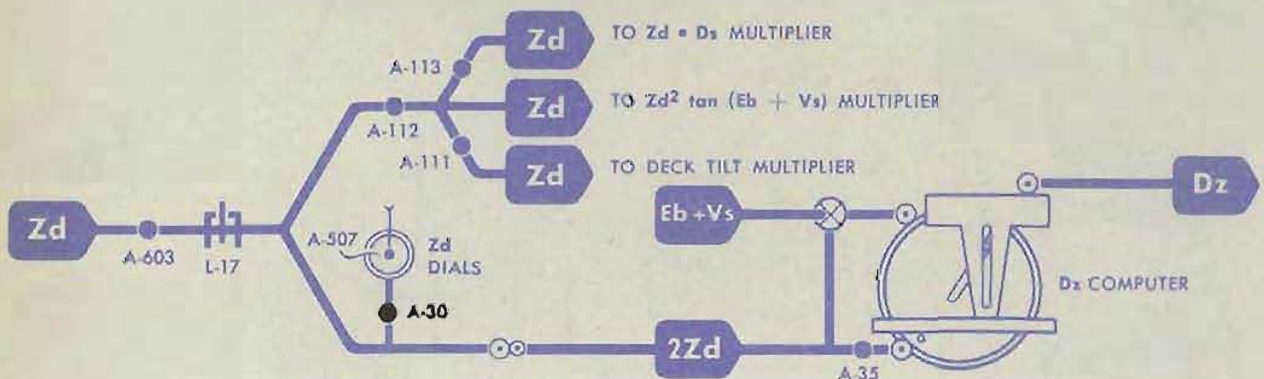
If the *Zd* dials do not show their proper values at the stop limits, make A-30 slip-tight.

Set the *Zd* dials at their proper reading by holding the *Zd* input against the stop and turning the square mounting plate behind the *Zd* dials.

Tighten A-30 and recheck by running *Zd* to the other limit.

Readjust A-603 and any other clamps loosened.

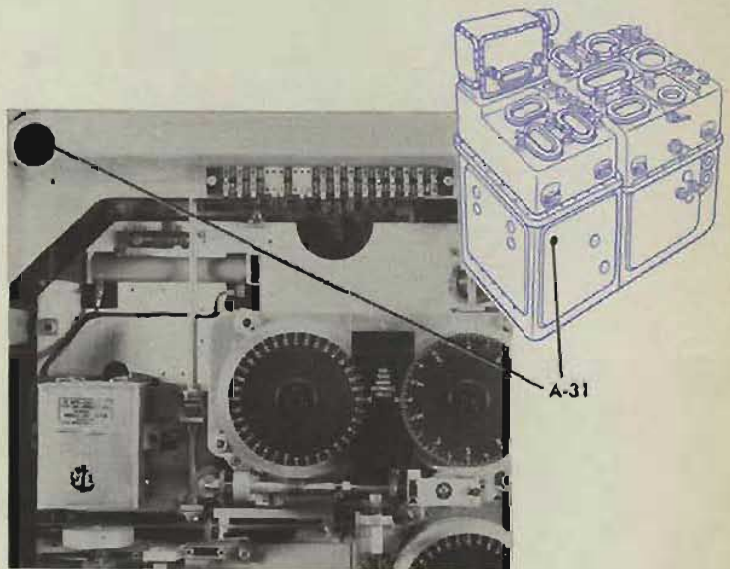
Check A-112, A-35, A-113 and A-111.



A-31 Dd DIALS to L-32

Location

A-31 is under cover 8, on the *Dd* dial group shaft behind the *Dd* dials. L-32 can be seen through a 2-inch hole above the damper of the *jB'r* follow-up motor. The upper limit is toward the left of the computer.

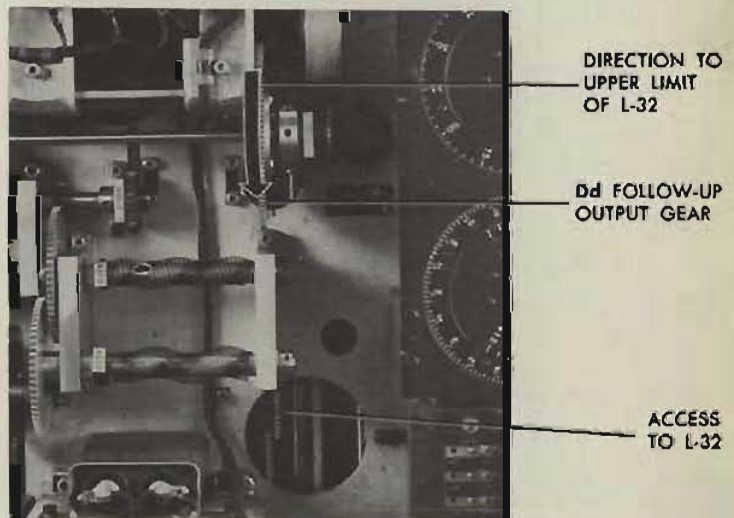


Check

Turn the power OFF.

Turn the *Dd* follow-up output gear until the upper limit of L-32 is reached. The *Dd* dials should read $+120^\circ$.

Turn the gear in the opposite direction to reach the lower limit of L-32. The *Dd* dials should read -120° .



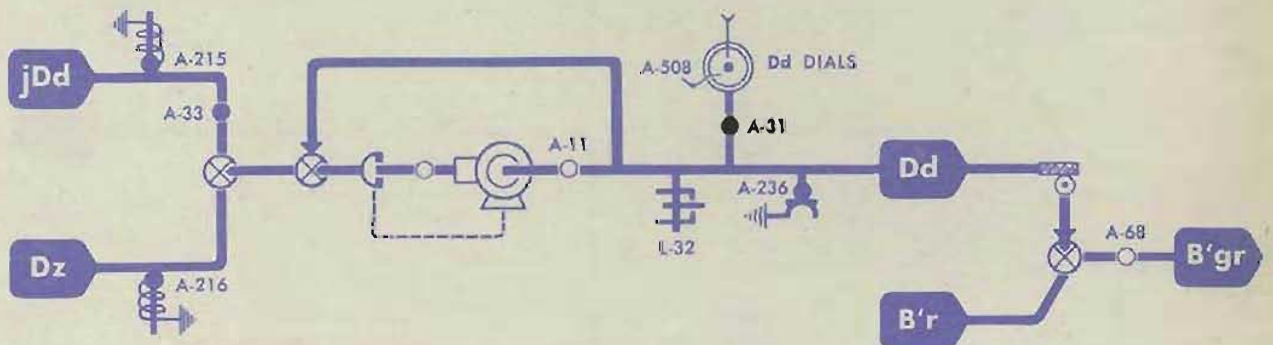
Adjustment

If the *Dd* dials do not read the correct values, hold the stop against one limit, loosen A-31, and set the dials at the proper value.

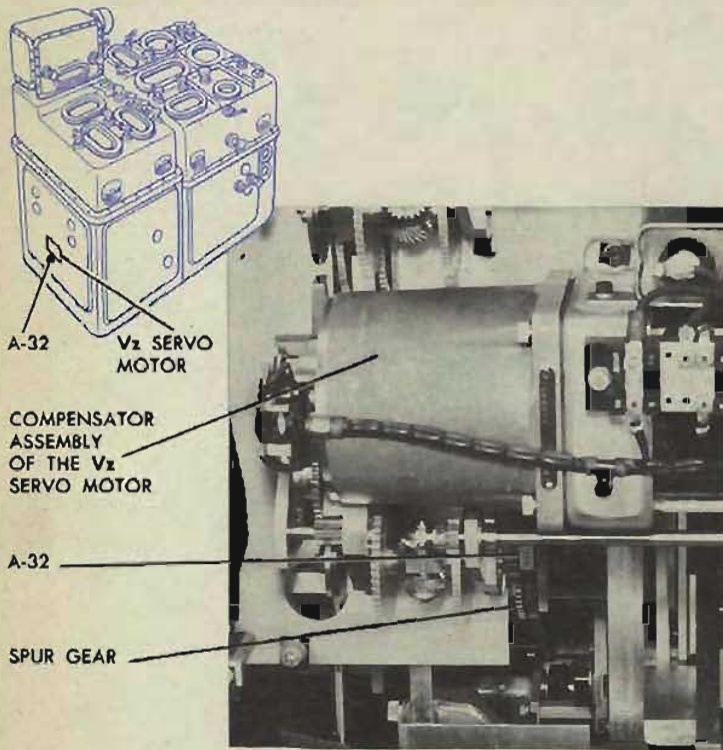
Tighten A-31 and recheck by turning the *Dd* follow-up output gear until the other limit is reached.

Split any overtravel.

Check A-68 and A-33.



A-32 $Zd^2 \tan (Eb + Vs)$ MULTIPLIER to $Eb + Vs$ LINE



Note

A-112, A-113, A-208, and A-63 should be checked before readjusting A-32.

Location

A-32 is under cover 7, below the compensator assembly on the Vz servo motor.

Check

Turn the power ON to energize the Vz follow-up.

Set L at 2000'.

Set E at 60° with the sync E handcrank at CENTER; then pull the handcrank OUT and match the sync E dials at the fixed index.

Set Vs at 2000'.

Set Ds at 500 mils.

Set Zd at 3200'.

The Vz dials should read +316'.

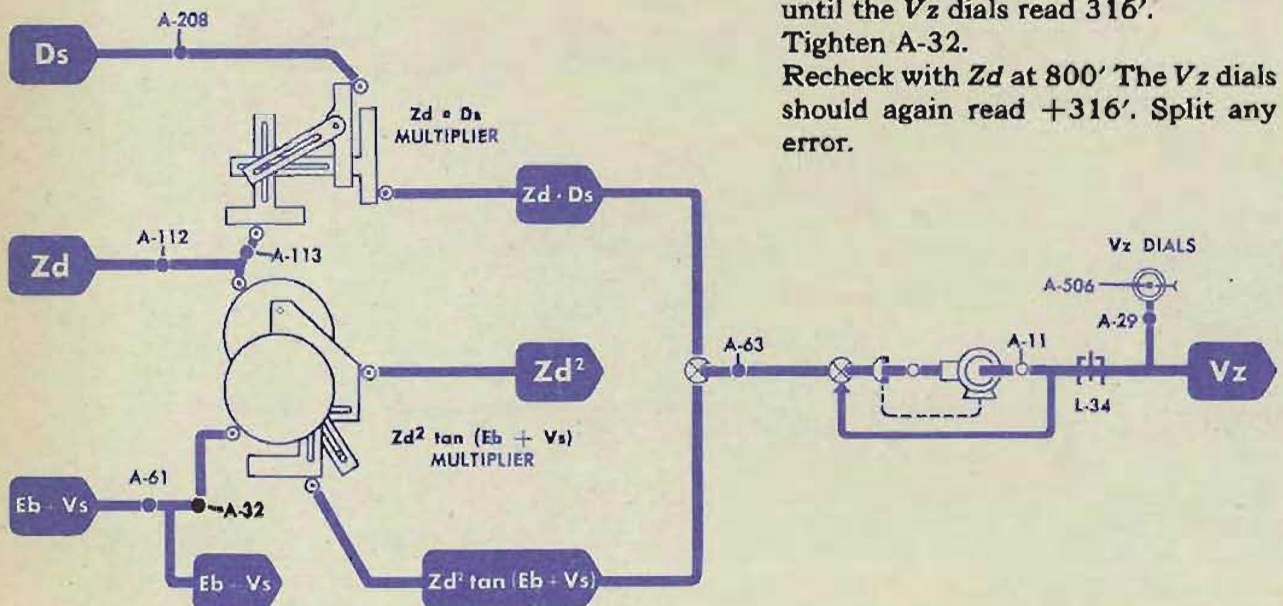
Adjustment

If the Vz dials do not read +316', make A-32 slip-tight.

Turn the spur gear next to the clamp until the Vz dials read 316'.

Tighten A-32.

Recheck with Zd at 800'. The Vz dials should again read +316'. Split any error.



A-33 SYNCHRONIZING THE Dd FOLLOW-UP

Note

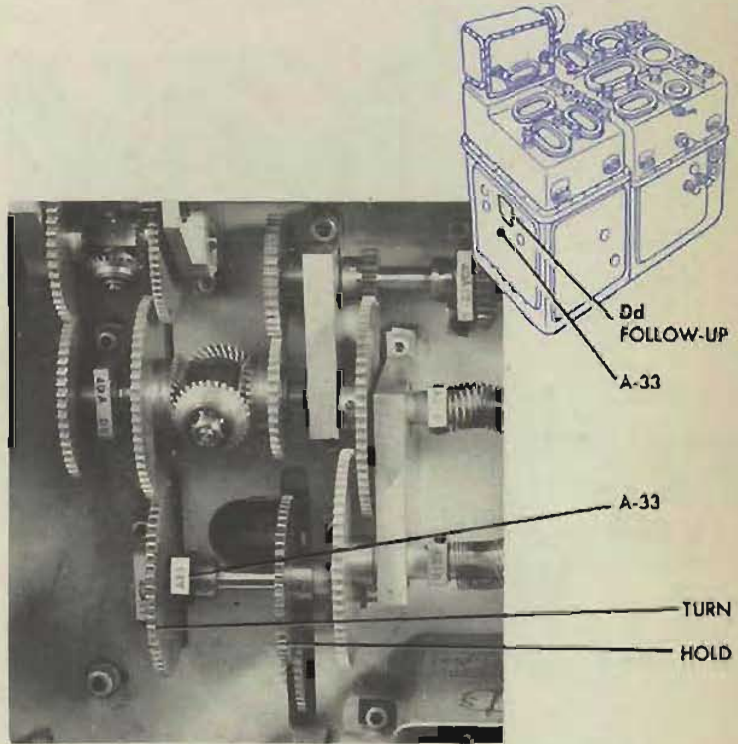
A-31 should be checked before readjusting A-33.

Location

A-33 is under cover 7, below the compensator assembly on the *Dd* follow-up.

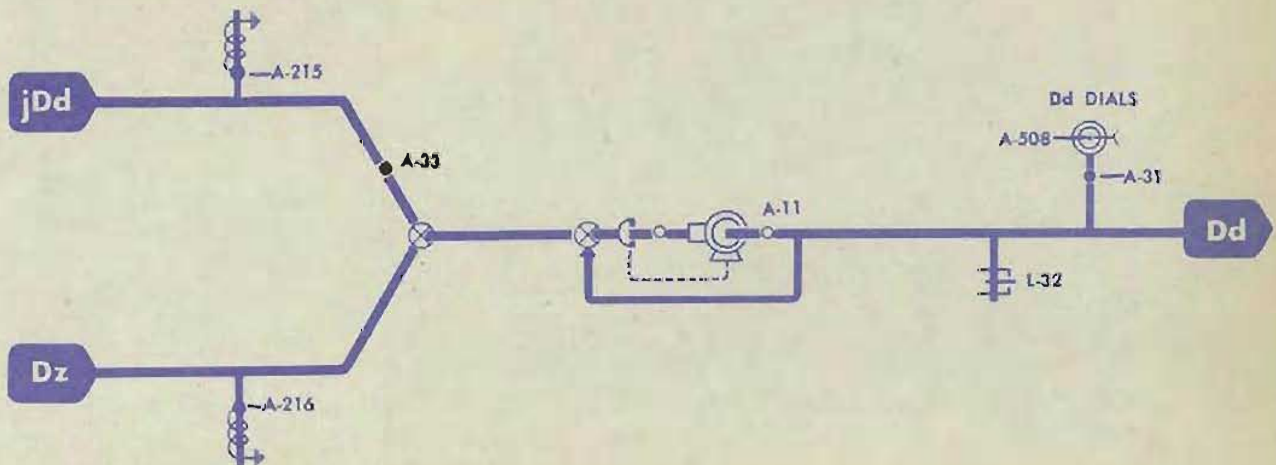
Check

Turn the power ON to energize the *Dd* follow-up.
 Set *Ds* at 500 mils.
 Set *Vs* at 2000'.
 Set *L* at 2000'.
 Set *Zd* at 2000'.
 Set *E2* at 0°.
 Set *Eb* at 0°.
 The *Dd* dials should read 0°.

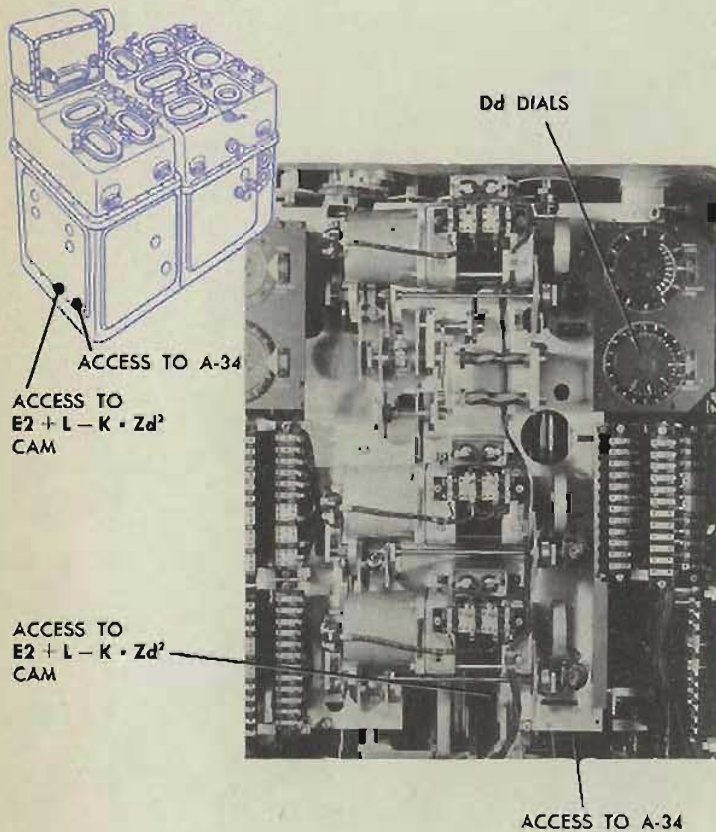


Adjustment

If the *Dd* dials do not read 0°, make A-33 slip-tight.
 Turn the spur gear next to A-33 until the *Dd* dials read 0°.
 Tighten A-33 and recheck.



A-34 jDd COMPUTER to E2+L-K·Zd² LINE



Location

A-34 is under cover 7. It is reached through an access at the lower right.

Check

Turn the power ON to energize the *Dd* follow-up motor.
 Set *L* at 2000'.
 Set *Zd* at 2000'.
 Set *Ds* at 750 mils.
 Set *E2* at 60°.
 The *Dd* dials should read +30°00'.

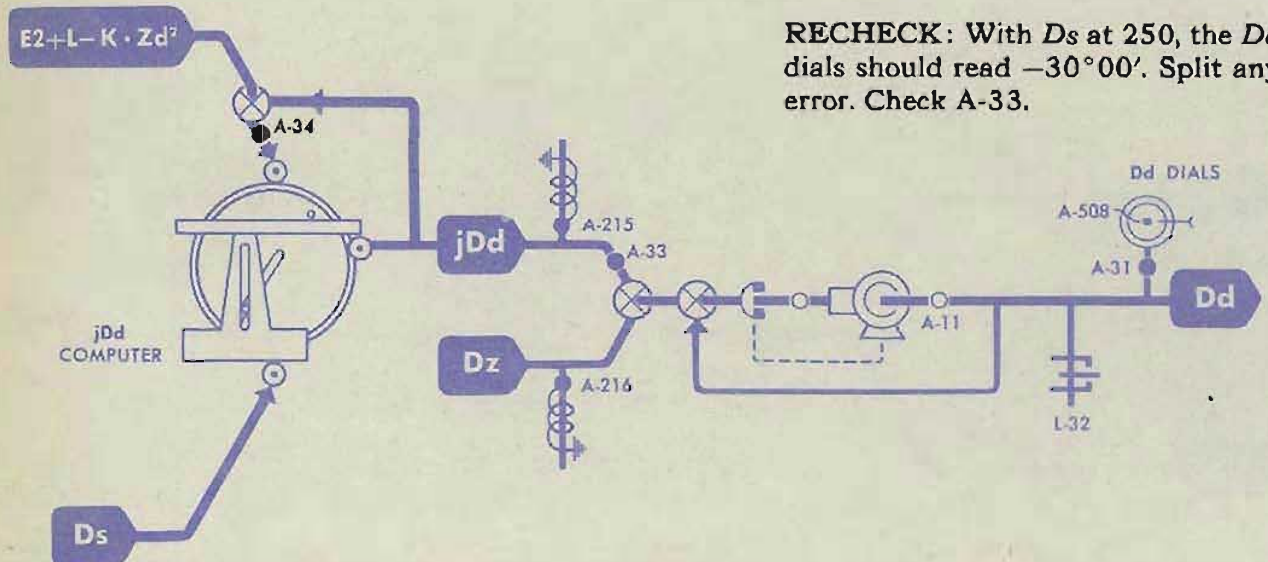
Adjustment

If the *Dd* dials do not read +30°00', make A-34 slip-tight.

Turn the *E2+L-K·Zd'* cam until the *Dd* dials read +30°00'.

Tighten A-34 and recheck.

RECHECK: With *Ds* at 250, the *Dd* dials should read -30°00'. Split any error. Check A-33.



A-35 Dz COMPUTER to Zd DIALS

Location

A-35 is under cover 7. It can be reached through a hole above the damper on the *jB'r* follow-up.

Check

- Turn the power ON.
- Set *Ds* at 500 mils.
- Set *Vs* at 2000'.
- Set *L* at 2000'.
- Set *Zd* at 2000'.

Turn the *Eb* line, using the sync *E* handcrank in the OUT position. Full travel of the *Eb* line should cause no movement of the output rack of the *Dz* computer.

Mark the *Dd* follow-up output gear for use as an indicator to check for any motion of the *Dz* output rack.

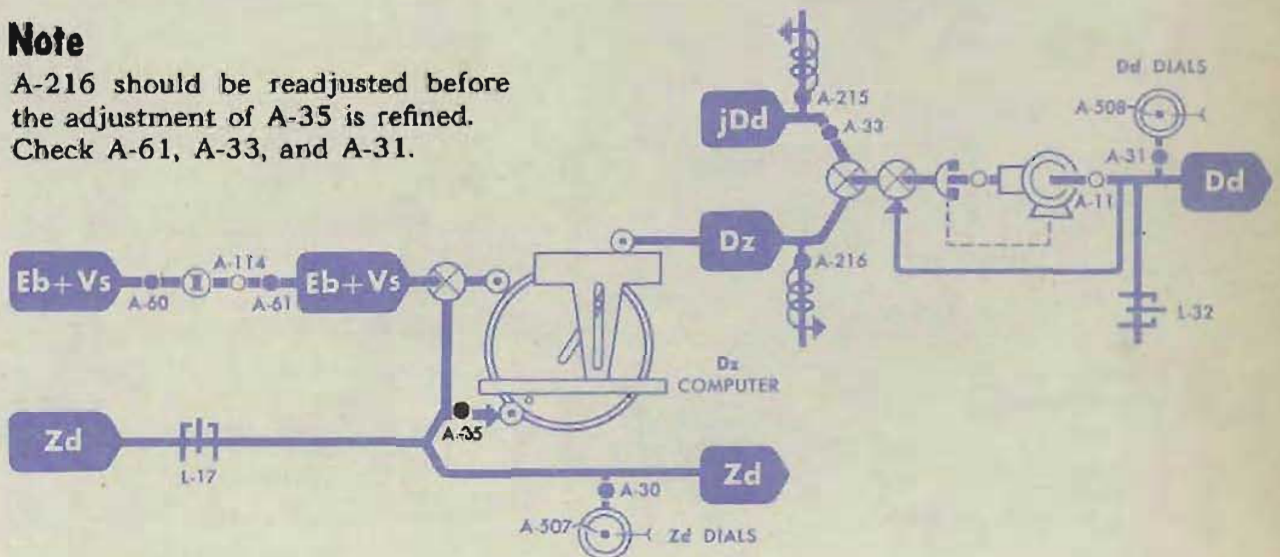
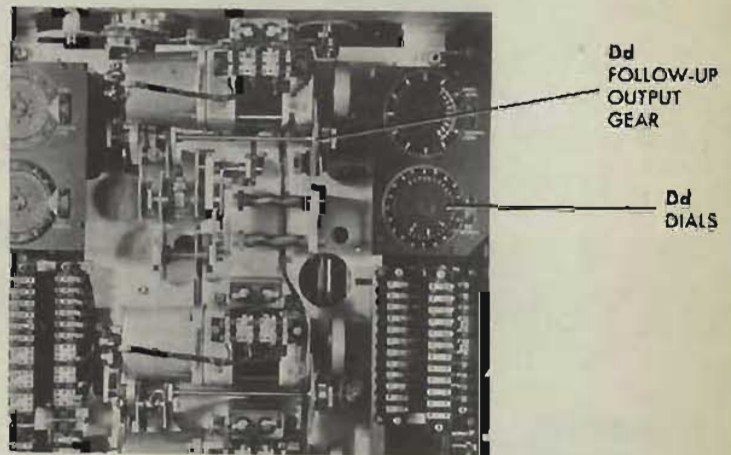
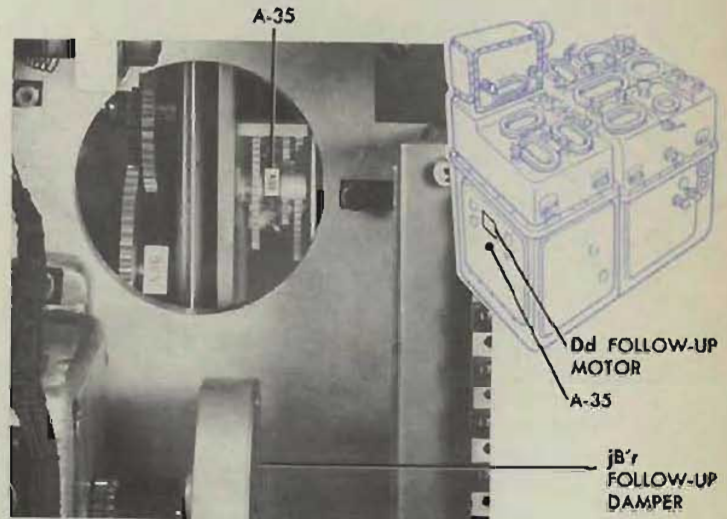
Adjustment

If there is any motion of the *Dd* follow-up output gearing, slip-tighten A-35. Adjust the slot in the vector gear to a horizontal or zero position by turning the vector gear with a gear pusher. At the zero position there will be no movement of the *Dd* follow-up output gearing for full travel of the *Eb* line.

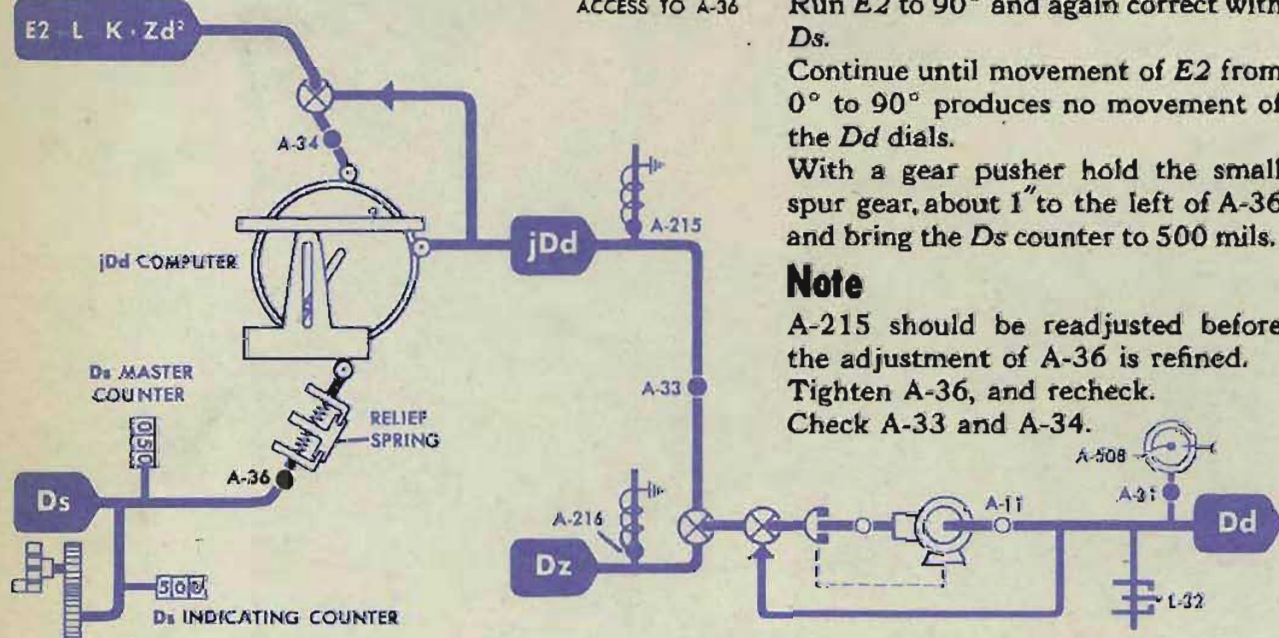
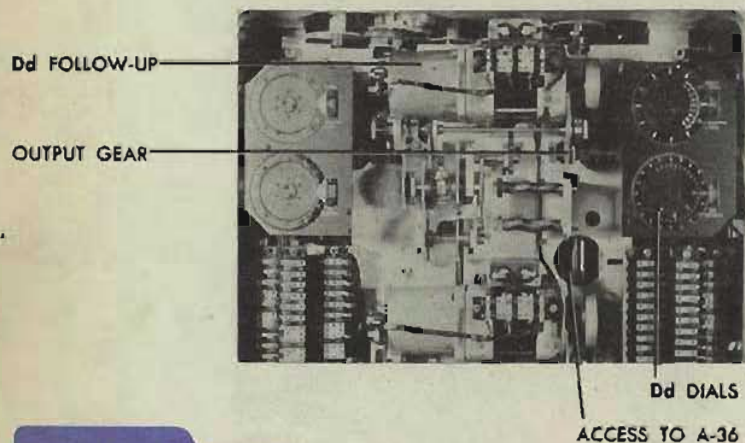
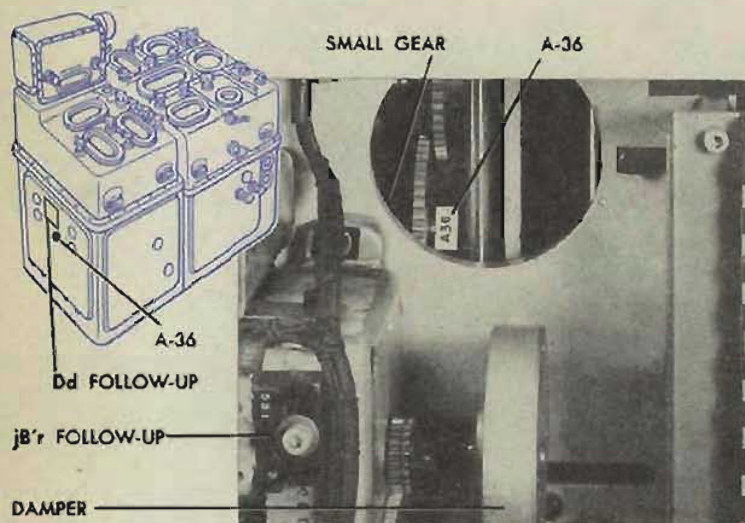
WARNING: After each adjustment of the vector gear, check that *Zd* has not moved off 2000'.

Note

A-216 should be readjusted before the adjustment of A-35 is refined. Check A-61, A-33, and A-31.



A-36 jDd COMPUTER to Ds COUNTER



Location

A-36 is under cover 7. It is reached through a hole above the damper of the jB'r follow-up motor.

Check

- Turn the power ON.
- Set Ds at 500 mils.
- Set L at 2000'.
- Set Zd at 2000'.

The Ds input rack should be at a position where full travel of E2 will cause no motion of the jDd output gear.

Any motion of the jDd output gear is indicated by movement of the Dd follow-up output gearing.

Adjustment

The jDd computer is unusual in that the vector gear is the output. If there is any movement of the Dd follow-up output gearing, make A-36 slip-tight. Adjust the input rack to the zero position as follows:

- Set E2 at 0°.
- Note the reading of the Dd dials.
- Run E2 to 90°.
- Turn the Ds handcrank to bring the Dd dials back to the same value noted when E2 was at zero.
- Run E2 back to zero.
- Note the new reading of the Dd dials.
- Run E2 to 90° and again correct with Ds.

Continue until movement of E2 from 0° to 90° produces no movement of the Dd dials.

With a gear pusher hold the small spur gear, about 1" to the left of A-36, and bring the Ds counter to 500 mils.

Note

- A-215 should be readjusted before the adjustment of A-36 is refined.
- Tighten A-36, and recheck.
- Check A-33 and A-34.

A-37 SYNCHRONIZING THE $Tf/R2$ FOLLOW-UP

Location

A-37 is under cover 4, in the $Tf/R2$ ballistic computer.

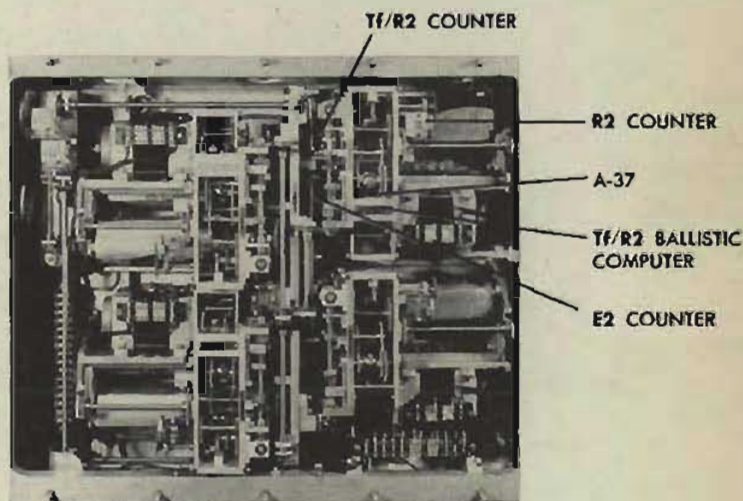
Check

Refer to the N.I.O. final test sheet for the particular unit being checked.
Turn the power ON.

Set $E2$ and $R2$ ($R2m$ on Ser. Nos. 811 and higher) at the values given on the N.I.O. final test sheet.

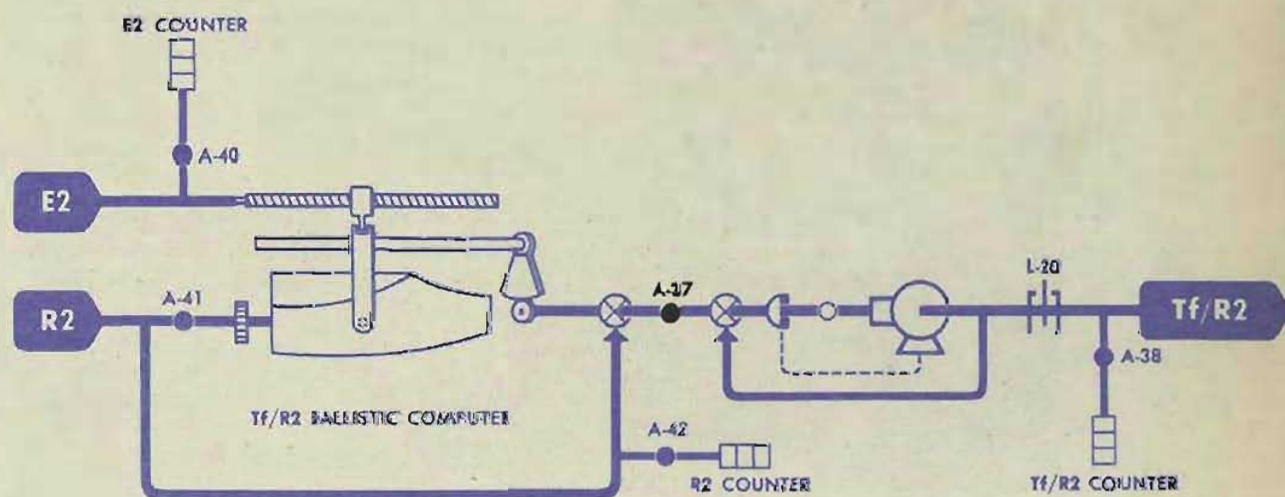
Read the $Tf/R2$ unit counter and note any variation from the corresponding values recorded on the test sheet.

If the $Tf/R2$ value is consistently less or consistently greater than the recorded value, A-37 is in error and should be readjusted.

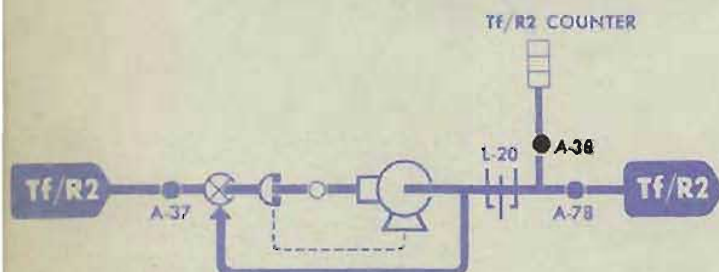
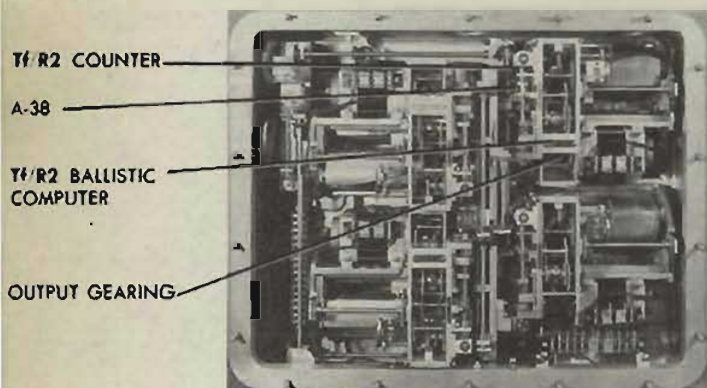


Adjustment

Loosen A-37. Turn the gear on which it is mounted to synchronize the follow-up at the correct value of $Tf/R2$. Tighten A-37. Refer to the N.I.O. final test sheets and run the complete test of the $Tf/R2$ ballistic computer. If necessary, A-37 may be readjusted slightly to improve the readings.



A-38 Tf/R2 COUNTER to L-20



Location

A-38 and L-20 are under cover 4, in the *Tf/R2* ballistic computer.

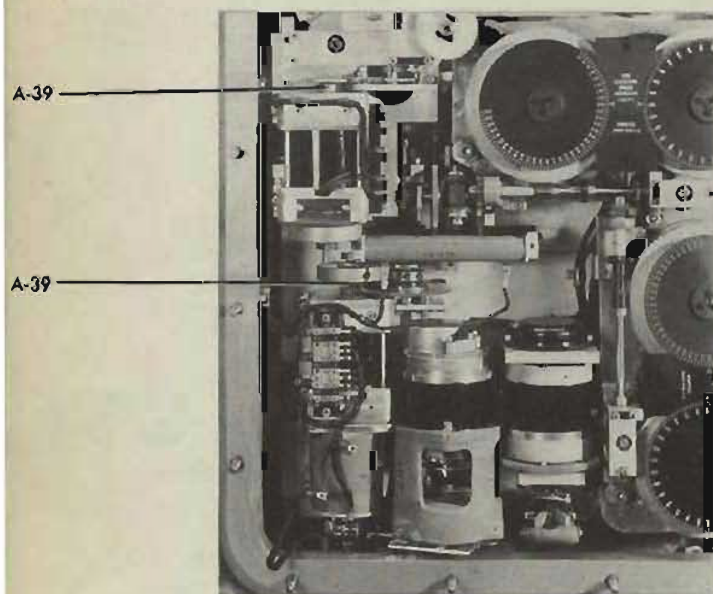
Check

Turn the power OFF.
Turn the *Tf/R2* ballistic computer output gearing from limit to limit. The *Tf/R2* counter should read 0.00122 at the lower limit and 0.00336 at the upper limit. On Mods 8 and 12 the limits are 0.001184 to 0.002674.

Adjustment

Loosen A-38. Hold the *Tf/R2* line against the stop and slip the counter to the correct reading. Tighten A-38 and recheck. Check A-37 and A-78.

A-39 ASSEMBLY CLAMPS



Location

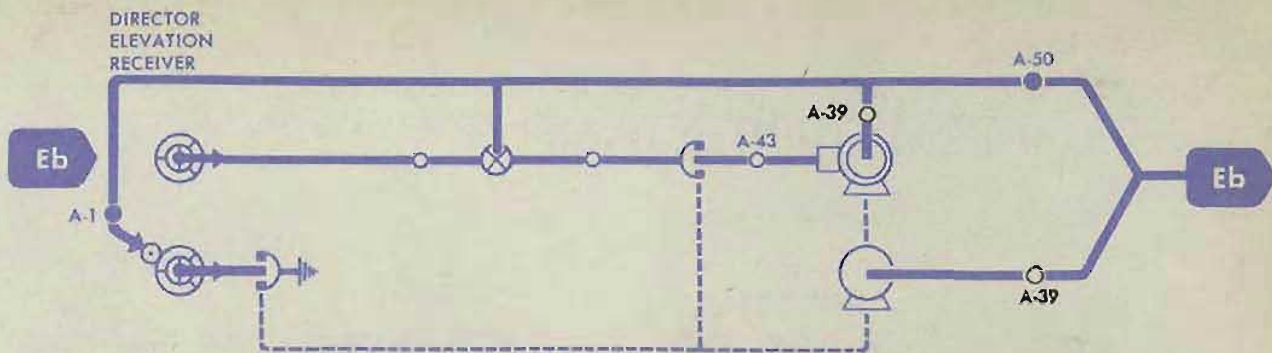
A-39 is under cover 6. There are two clamps numbered A-39, one on each servo motor output shaft of the two *Eb* follow-ups.

Check

If either A-39 is loose, the servo on which it is located may drive without producing any output motion in the computer.

Adjustment

Tighten A-39.



A-40 E2 COUNTER to Tf/R2 BALLISTIC COMPUTER

Location

A-40 is under cover 4, in the *Tf/R2* ballistic computer.

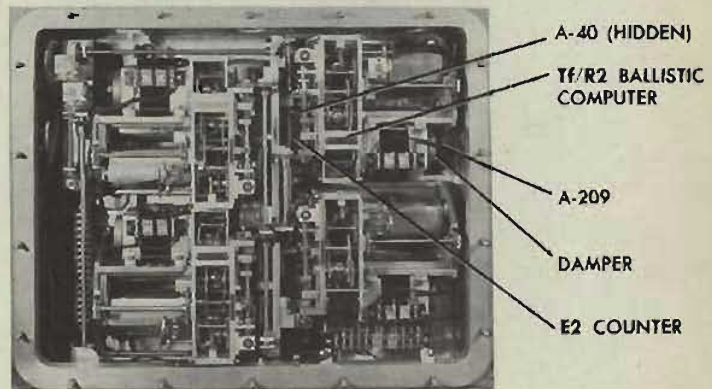
Check

Turn the power OFF.

Set *E2* and *R2* (*R2m* on Ser. Nos. 811 and higher) at the values listed on the legend plate.

Loosen A-209 on the *Tf/R2* follow-up damper, and push the damper to the end of the shaft.

Insert a 3/16-inch setting rod through the casting, the follower arm, and the cam. If it is necessary to change the *E2* input to insert the rod, A-40 is up-set and should be readjusted.



Adjustment

With the setting rod inserted, loosen A-40.

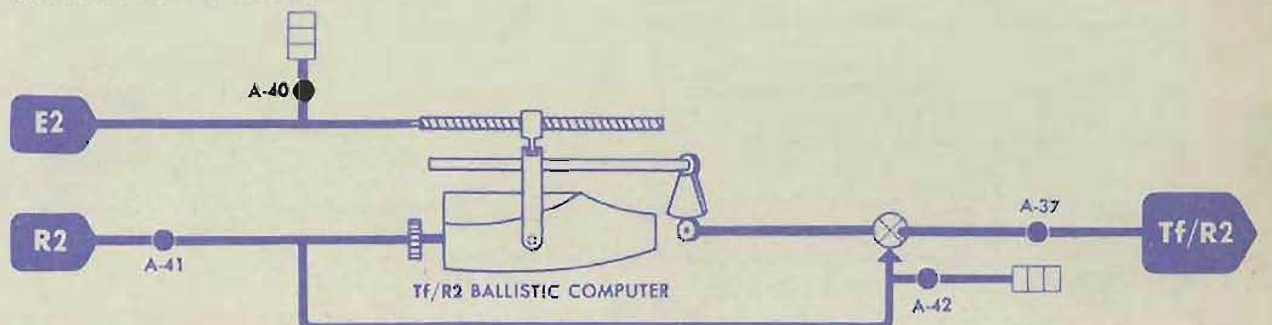
Turn the *E2* counter until it reads the value specified on the legend plate. Tighten A-40 and recheck.

Remove the setting rod.

Replace the damper on the follow-up shaft and tighten A-209.

Check that *E2* can be varied from 0° to 90°.

Check A-37 and A-41.



A-41 R2 (or R2m) COUNTER to L-21

Location

A-41 and L-21 are under cover 4, in the *Tf/R2* ballistic computer.

Check

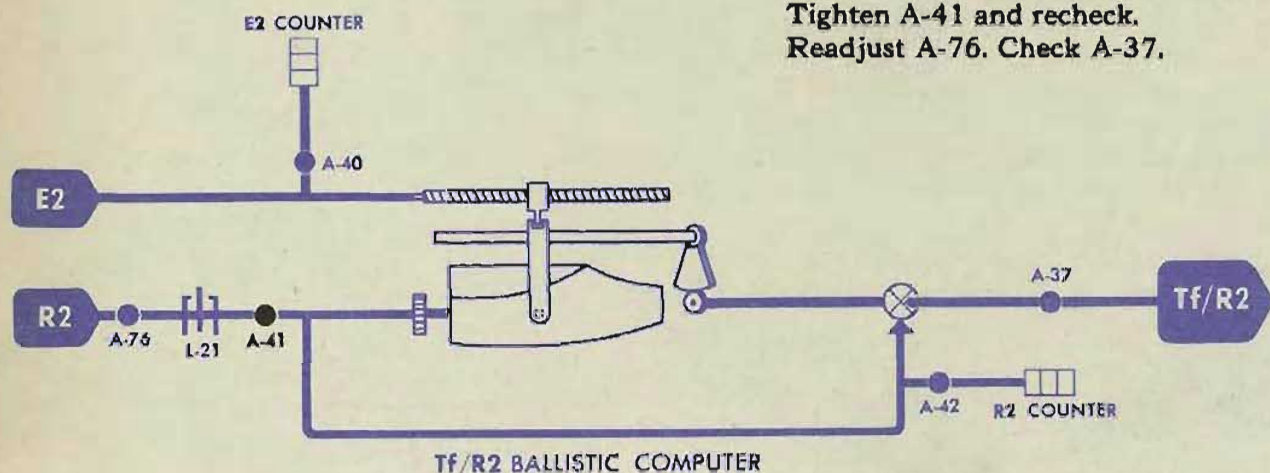
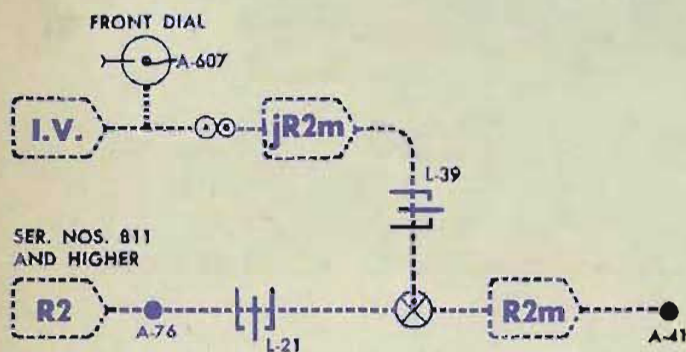
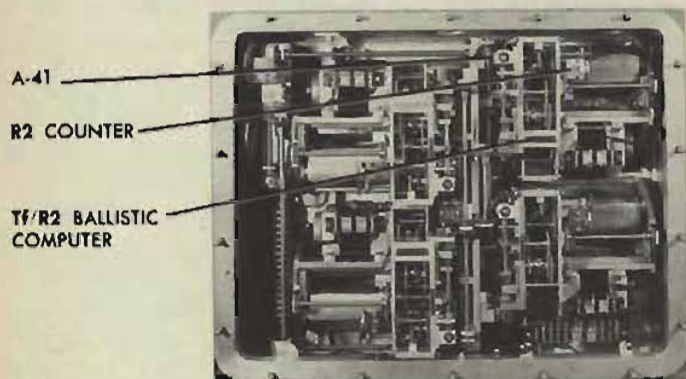
NOTE: In computers with Ser. Nos. 811 and higher, *R2m* is used.

Turn the power OFF.
 Set front *I.V.* at 2550 f.s. (Ser. Nos. 811 and higher).
 Loosen A-76.
 Turn the *R2* (or *R2m*) input to the *Tf/R2* ballistic computer from limit to limit.

The *R2* or *R2m* counter should read 300 yards at the lower limit, and 18,200 yards at the upper limit on Mods 3, 4, 6, 7, 10, and 13. On Mods 0, 1, 2, and 9, the limits are 1,300 and 18,200 yards. On Mods 8 and 12, the limits are 300 and 20,200 yards.

Adjustment

If the *R2* (or *R2m*) counter does not read the proper values, loosen A-41. Hold the line against the stop and turn the counter to the correct value. Tighten A-41 and recheck. Readjust A-76. Check A-37.



A-42 R2 (or R2m) COUNTER to Tf/R2 BALLISTIC COMPUTER

Location

A-42 is under cover 4, in the *Tf/R2* ballistic computer.

Check

NOTE: In computers with Ser. Nos. 811 and higher, *R2m* is used.

Turn the power OFF.

Set *E2* and *R2* (or *R2m*) at the values listed on the legend plate.

Loosen A-209 on the *Tf/R2* follow-up damper and push the damper to the end of the shaft.

Insert a 3/16-inch setting rod through the casting, the follower arm and the cam.

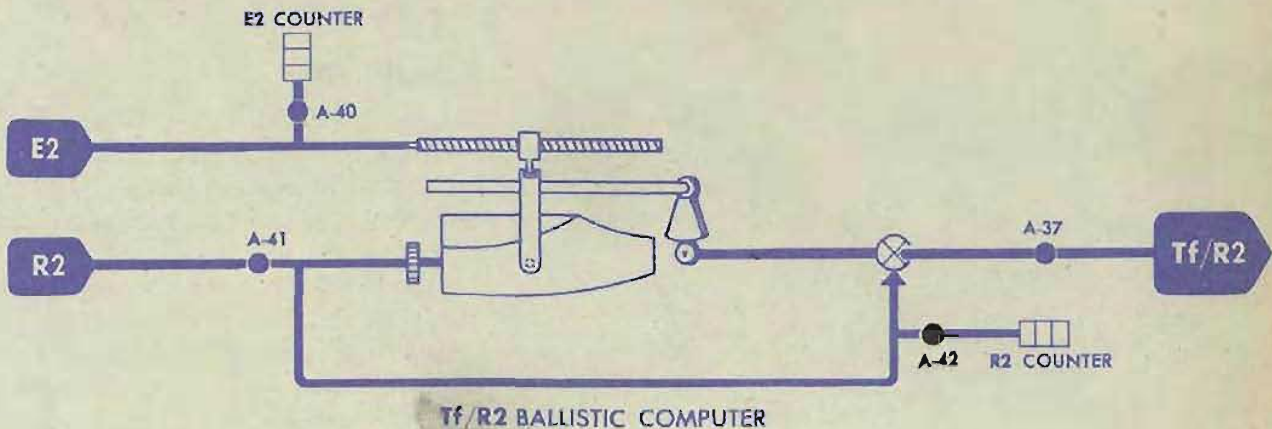
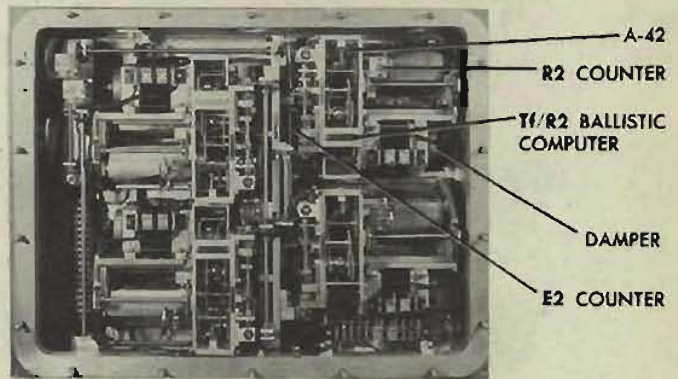
If it is necessary to change *R2* (or *R2m*) to insert the rod, A-42 is upset and should be readjusted.

Adjustment

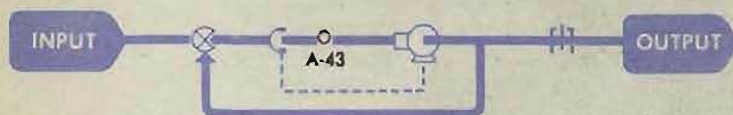
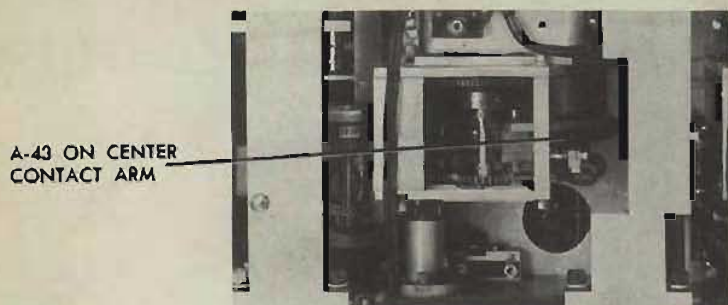
With the setting rod inserted, loosen A-42.

Turn the *R2* (or *R2m*) counter until it reads the value specified on the legend plate.

Tighten A-42 and recheck. Remove the setting rod. Replace the damper on the follow-up, and tighten A-209. Check A-41, A-37 and A-76.



A-43 ASSEMBLY CLAMPS



Location

There is a small assembly clamp numbered A-43 on the center contact arm of each follow-up.

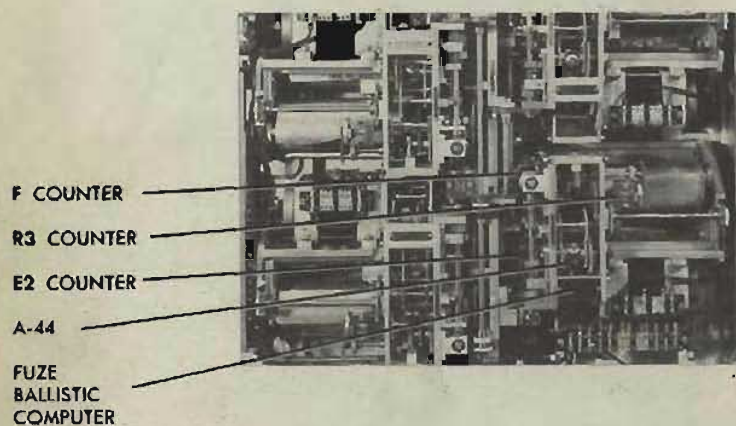
Check

If an A-43 clamp is loose, the follow-up on which it is located may oscillate. See *The Follow-up* in OP 1140A.

Adjustment

Tighten A-43.

A-44 SYNCHRONIZING THE F FOLLOW-UP



Location

A-44 is under cover 4, in the fuze ballistic computer.

Check

Refer to the N.I.O. final test sheet for the particular unit being checked.

Put the *F* handcrank in the OUT position. Turn the power ON.

Set *E2* and *R3* at the values given on the N.I.O. final test sheet.

Read the *F* unit counter and note any variation from the corresponding values recorded on the test sheet.

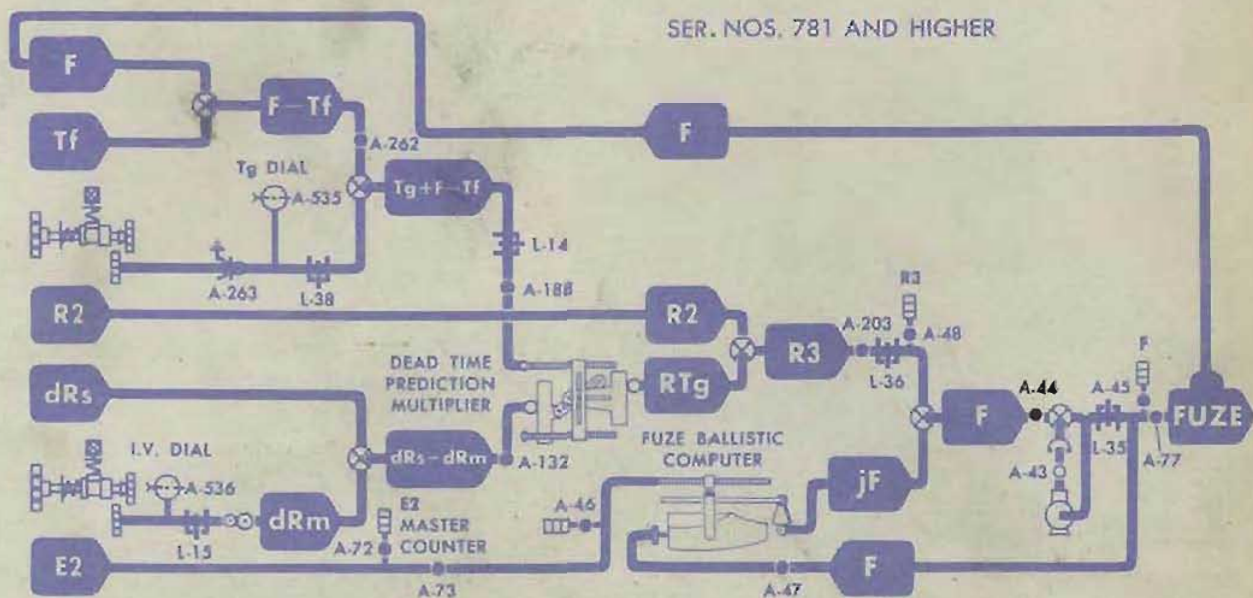
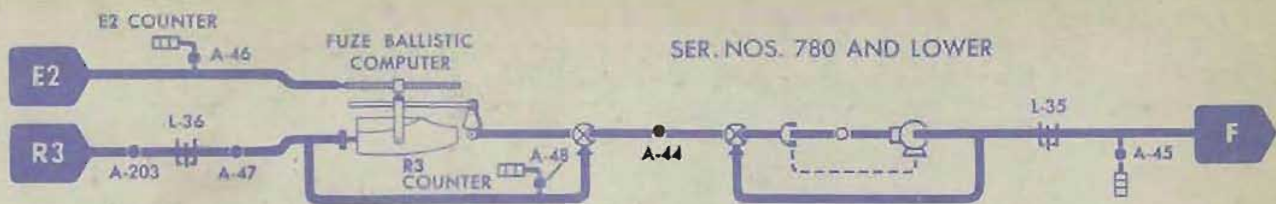
On Ser. Nos. 780 and lower, if the *F* value is consistently greater, or consistently less than the recorded value, A-44 is in error and should be readjusted.

On Ser. Nos. 781 and higher, if the error in *F* becomes progressively greater as *R3* is increased, A-44 is in error and should be readjusted.

Adjustment

Loosen A-44. Turn the gear on which it is mounted to synchronize the follow-up at the correct value of *F*. (On Ser. Nos. 781 and higher, make the adjustment while *R3* is set at a high value.) Tighten A-44 and recheck.

Refer to the N.I.O. acceptance test sheets and run the complete test of the fuze ballistic computer. A-44 may be readjusted slightly to improve the readings.



A-45 F COUNTER to L-35

Location

A-45 and L-35 are under cover 4, in the fuze ballistic computer.

Check

Turn the power OFF.

Turn the fuze ballistic computer output gearing from limit to limit.

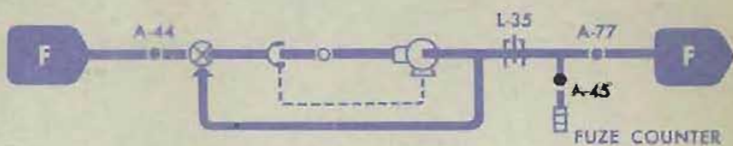
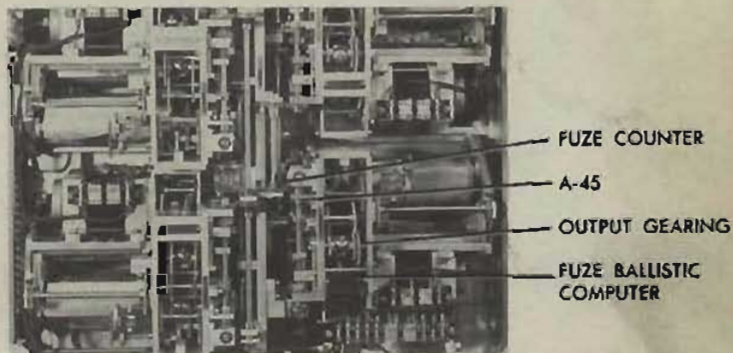
The fuze counter should read 0.60 second at the lower limit, and 55.00 seconds at the upper limit on Mods 3, 10, 4, "Univ" 7, and 13. On Mods 0, 2, 1, and 9, the limits are 0.60 and 45.05 seconds. On Mods 6 and "Old" 7, the limits are 0.60 and 45.00 seconds. On Mods 8 and 12, the limits are 0.60 and 49.00 seconds.

Adjustment

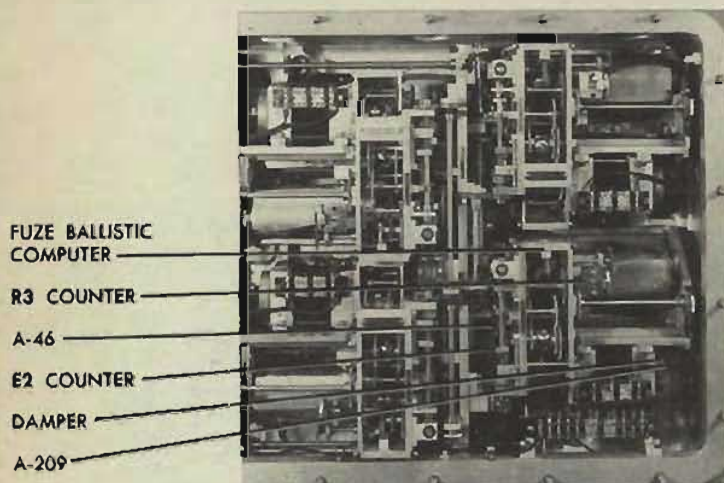
If the F counter does not read the proper values, loosen A-45. Slip the counter to the correct reading. Tighten A-45 and recheck.

Check A-44 and A-77.

On Ser. Nos. 781 and higher, also check A-47.



A-46 E2 COUNTER to F BALLISTIC COMPUTER



Location

A-46 is under cover 4, in the fuze ballistic computer.

Check

Turn the power OFF.

Set *E2* and *R3* (*F* on Ser. Nos. 781 and higher) at the values listed on the legend plate.

Loosen A-209 on the fuze follow-up damper and push the damper to the end of the shaft.

Insert a 3/16-inch setting rod through the casting, the follower arm, and the cam.

If it is necessary to change the *E2* input, A-46 is upset and should be re-adjusted.

Adjustment

With the setting rod inserted, loosen A-46. Turn the *E2* counter until it reads the value specified on the legend plate.

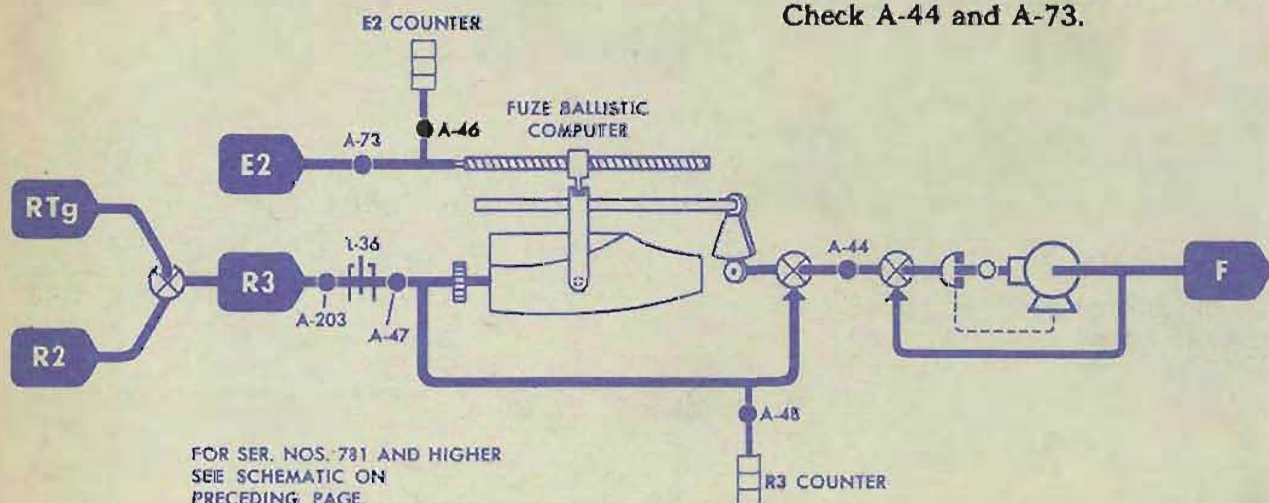
Tighten A-46 and recheck.

Remove the setting rod.

Replace the damper on the follow-up shaft and tighten A-209.

Check that *E2* can be moved from 0° to 90°.

Check A-44 and A-73.



A-47 R3 COUNTER to L-36 SER. NOS. 780 and LOWER

Location

A-47 and L-36 are under cover 4, in the fuze ballistic computer.

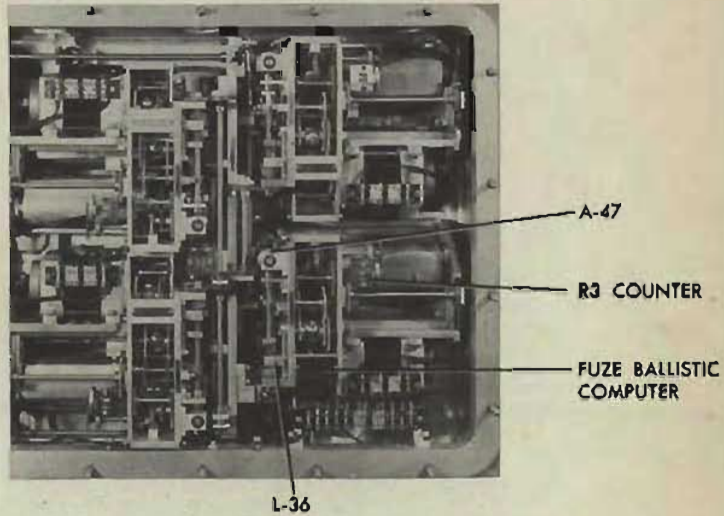
Check

Turn the power OFF.

Loosen A-203.

Turn the R3 input to the fuze ballistic computer from limit to limit.

The R3 counter should read -1250 yards at the low limit, and 19,750 yards at the high limit on Mods 3, 4, 6, 7, 10, and 13 below Ser. Nos. 781. On Mods 0, 1, 2, and 9, the limits are -250 and 19,750 yards.

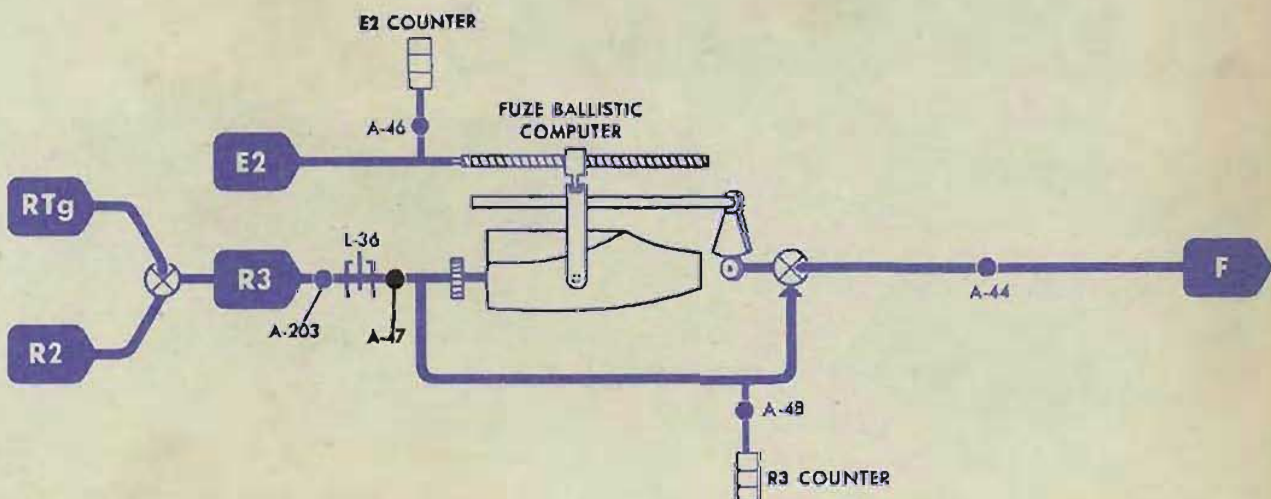


Adjustment

If the R3 counter does not read the proper values, loosen A-47. Hold the line against one limit and turn the R3 counter gearing until the counter reads the proper value. Tighten A-47 and recheck.

Readjust A-203.

Check A-44.



A-47 F COUNTER to F BALLISTIC CAM SER. NOS. 781 and HIGHER

Location

A-47 is under cover 4, in the fuze ballistic computer.

Check

Turn the power OFF.

Set *E2* and *F* at the values listed on the legend plate.

Loosen A-209 on the fuze follow-up damper, and push the damper to the end of the shaft.

Insert a 3/16-inch setting rod through the casting, the follow-up arm, and the cam.

If it is necessary to change the *F* input to insert the rod, A-47 is upset and should be readjusted.

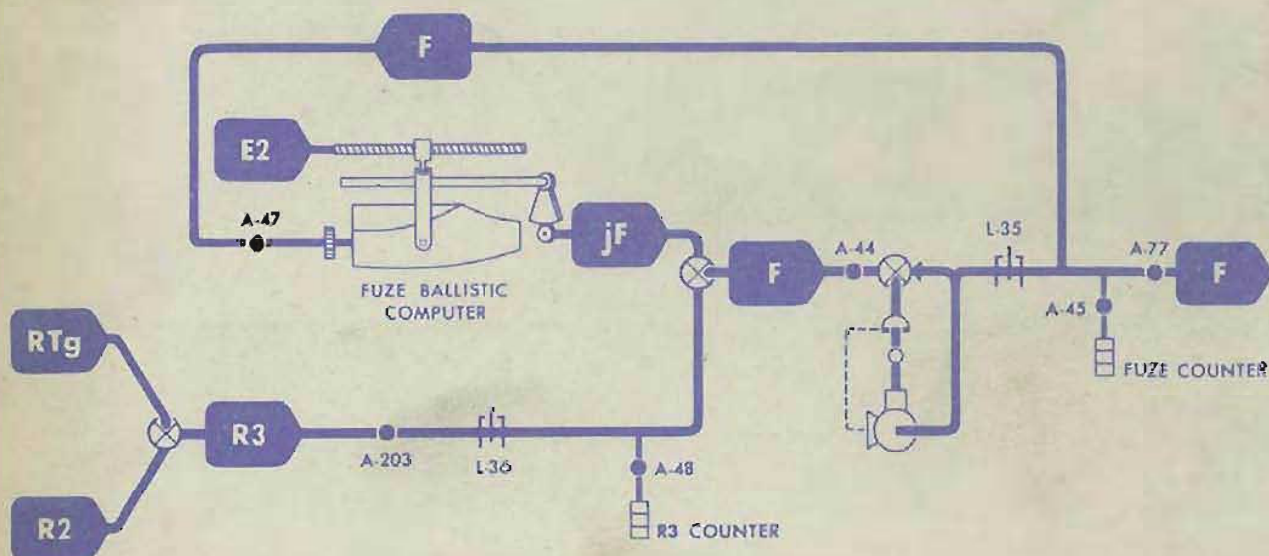
Adjustment

With the setting rod inserted, loosen A-47. Turn the *F* line until the counter reads the value specified on the legend plate. Tighten A-47 and recheck.

Remove the setting rod.

Replace the damper on the follow-up shaft and tighten A-209. Check A-44.

E² - 9005
F 3999



A-48 R3 COUNTER to L-36 SER. NOS. 781 and HIGHER

Location

A-48 and L-36 are under cover 4, in the fuze ballistic computer.

Check

Turn the power OFF.

Loosen A-203.

Turn the R3 input to the lower limit.

The R3 counter should read -13,150 yards (86850) in Mod 13, or -13,350 yards (86650) in Mods 8 and 12.

Check at the higher limit. In Mod 13 the higher limit is +31,650 yards. In Mods 8 and 12, the higher limit is +33,850 yards.

Adjustment

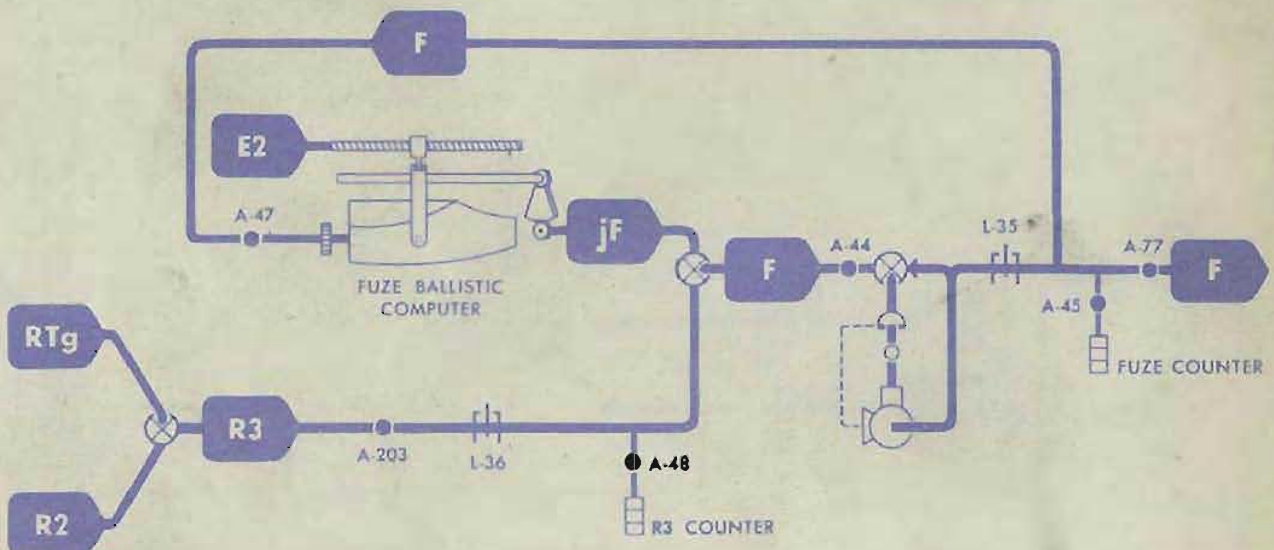
If the R3 counter does not read the proper values, loosen A-48.

Hold the line against the stop and turn the R3 counter gearing until the counter reads the correct value.

Tighten A-48 and recheck.

Readjust A-203.

Check A-44.



A-48 R3 COUNTER to F BALLISTIC COMPUTER SER. NOS. 780 and LOWER

Location

A-48 is under cover 4, in the fuze ballistic computer.

Check

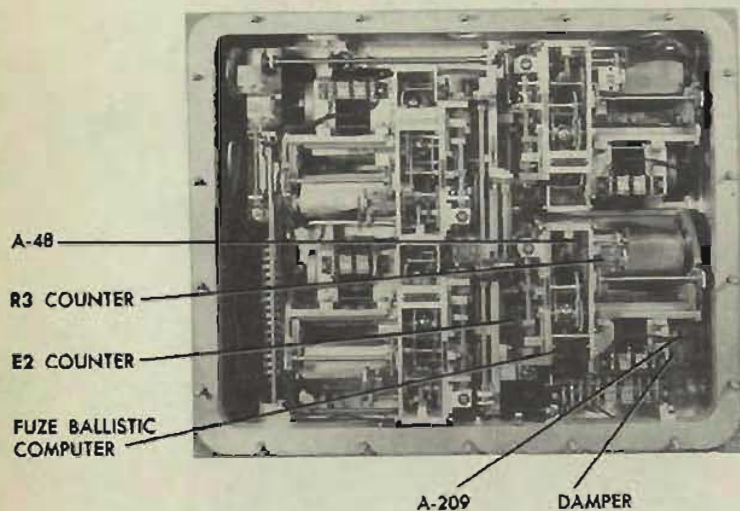
Turn the power OFF.

Set *E2* and *R3* at the values listed on the legend plate.

Loosen A-209 on the fuze follow-up damper, and push the damper to the end of the shaft.

Insert a 3/16-inch setting rod through the casting, the follower arm, and the cam.

If it is necessary to change the *R3* input to insert the rod, A-48 is upset and should be readjusted.



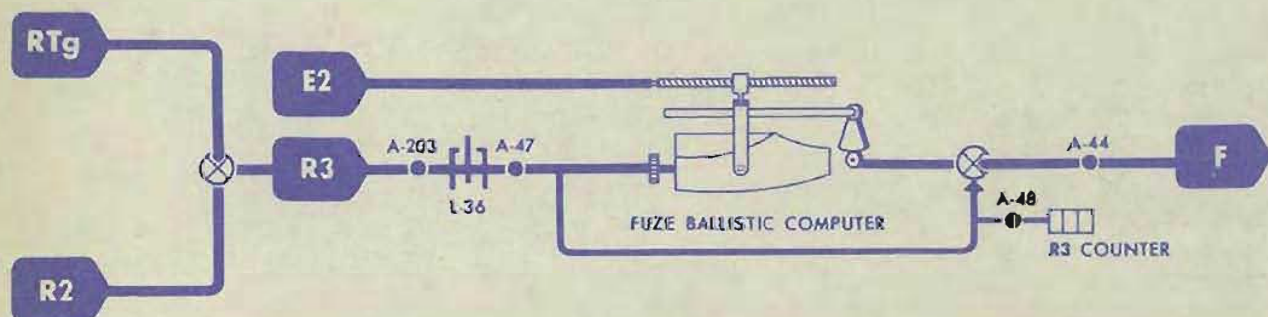
Adjustment

With the setting rod inserted, loosen A-48. Turn the *R3* counter gearing until the counter reads the value specified on the legend plate. Tighten A-48 and recheck.

Remove the setting rod.

Replace the damper on the follow-up shaft and tighten A-209.

Check A-47, A-44, and A-203.



A-49 Ph COMPUTER to PARALLAX COMPONENT SOLVER

Location

A-49 is under cover 6, at the left of the *Eb* receiver servo motor terminal block.

Check

Remove power leads 1B and 1BB on the *Dd* follow-up.

Turn the power ON.

Set *Dd* at 0° and wedge the gearing.

Turn the control switch to LOCAL.

Set *B'gr* at 0° , using the generated bearing crank.

Set *R2* at a high value.

Set *L* at 2000'.

Turn *E2* from 0° to 90° .

There should be no movement of the *Ph* dials.

Adjustment

If there is movement of the *Ph* dials, make A-49 slip-tight.

CAUTION: When A-49 is loosened, the input rack of the *Ph* computer may drop, causing damage to the unit. Make this clamp slip-tight, while holding the input rack.

Set *E2* at 0° and read the *Ph* dial.

Run *E2* to 75° .

Turn the small spur gear which is $1\frac{1}{2}$ inches to the left of A-49, until the *Ph* dial reads the original value.

Run *E2* to 0° and take a new reading of *Ph*.

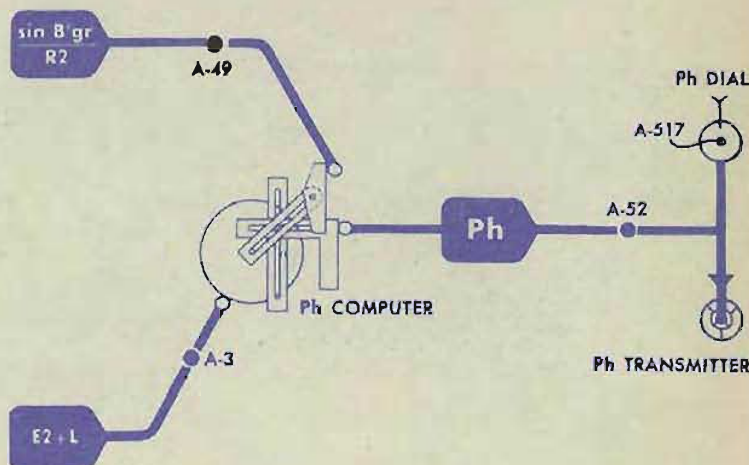
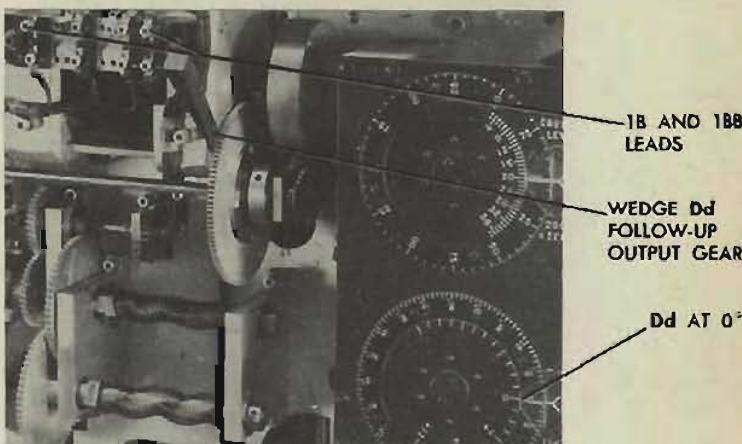
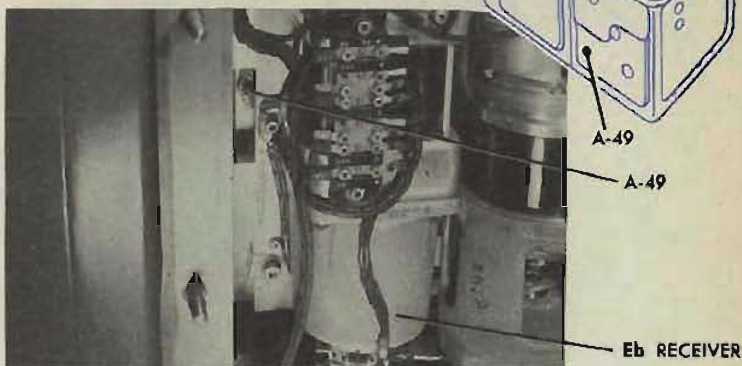
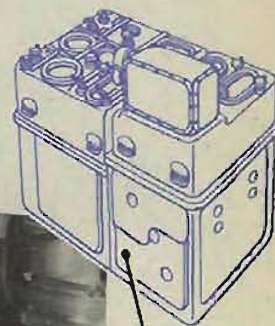
Again run *E2* to 75° and correct as before.

Continue the adjustment until there is no motion of *Ph* for full travel of *E2*.

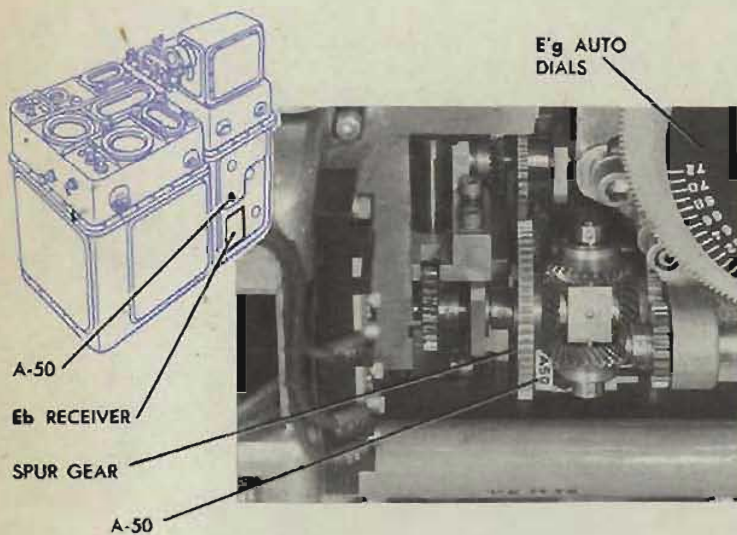
Tighten A-49.

Remove the wedge and replace the power leads on the *Dd* follow-up.

Check A-52 and A-3.



A-50 E'g DIALS to Eb RECEIVER

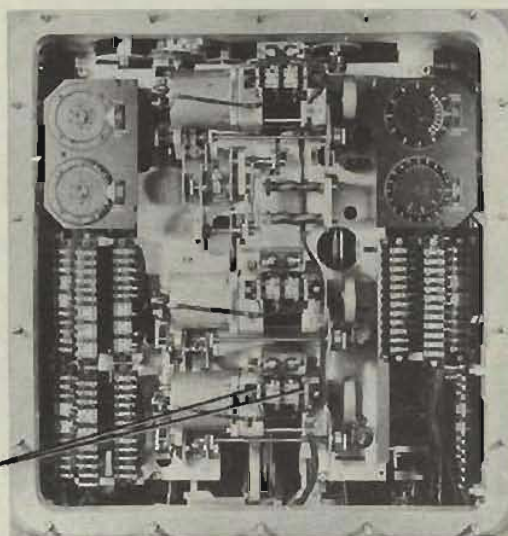


Location

A-50 is under cover 6, above the *Eb* receiver.

Check

Remove power leads 1D and 1DD from the *Vz* follow-up.
 Set *Vz* at 0 and wedge the line.
 Turn the power ON.
 Set *Vs* at 2000'.
 Put the sync *E* handcrank at CENTER.
 Transmit *Eb* from the director.
 The value read on the *E'g* dials should agree with the *Eb* value transmitted from the director.
 Check A-51 before readjusting A-50.

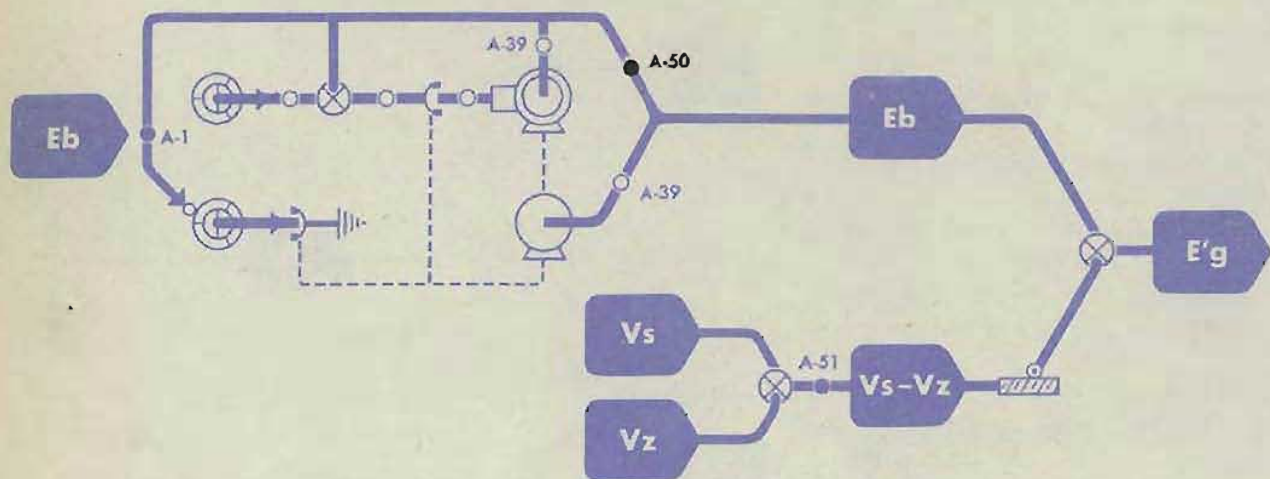


Adjustment

If the *E'g* dials do not read the correct value, slip-tighten A-50. Turn the spur gear next to the clamp until the *E'g* dials read the proper value.

Tighten A-50 and recheck.

Remove the wedge.



A-51 E'g DIALS to Vs - Vz LINE

Location

A-51 is under cover 6.

Check

Turn the power OFF.

Set L at 2000'.

Set V_s at 2000'.

Set E at 0° with the sync E handcrank at CENTER and match the sync E dials at the fixed index with the handcrank OUT.

Set V_z at 0 by turning the output gearing on the V_z servo motor.

The $E'g$ dials should read 2000'.

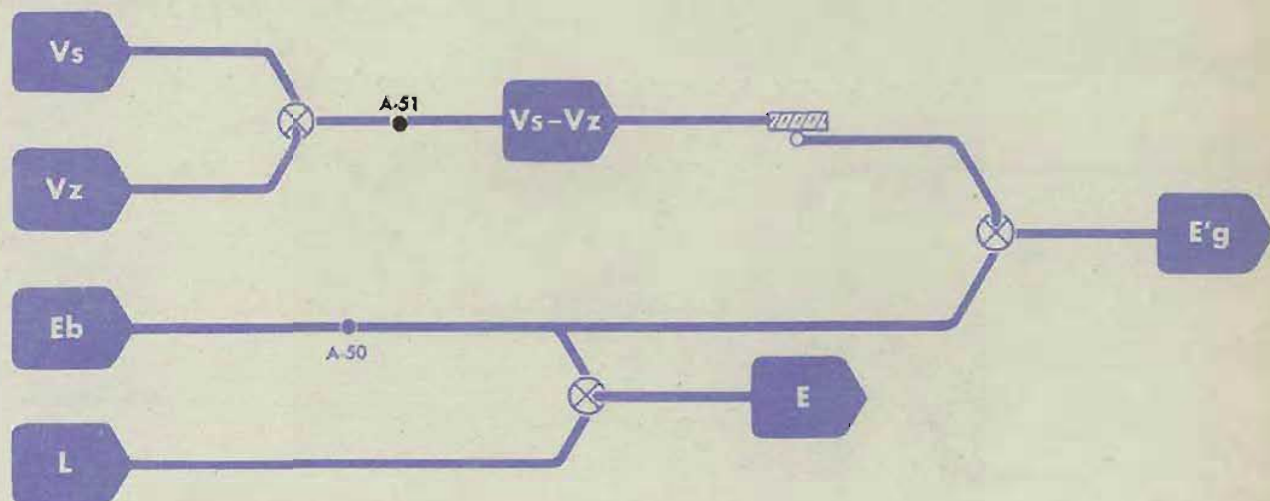
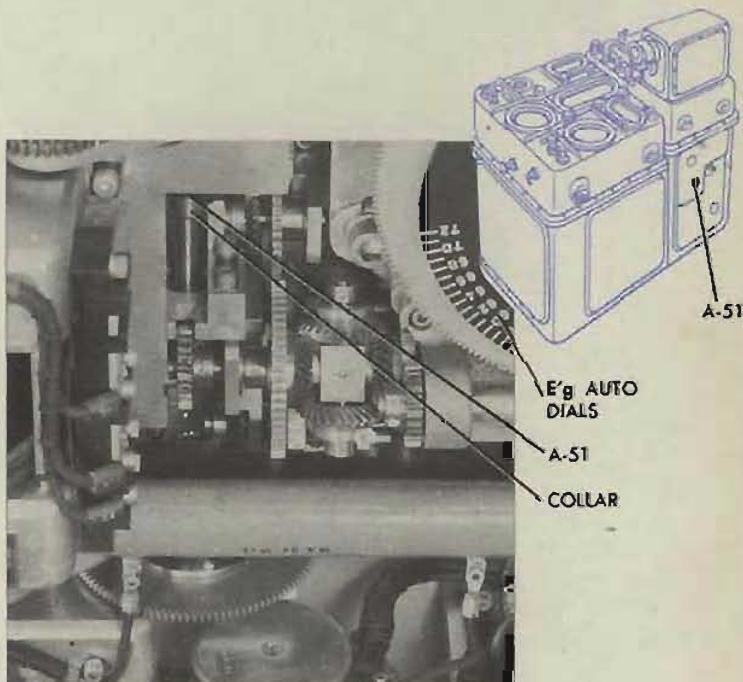
Adjustment

If the $E'g$ dials do not read 2000', loosen A-51. Set the V_z dials at 0, and wedge the V_z line. Turn the collar on the shaft below the clamp until the $E'g$ dials read 2000'.

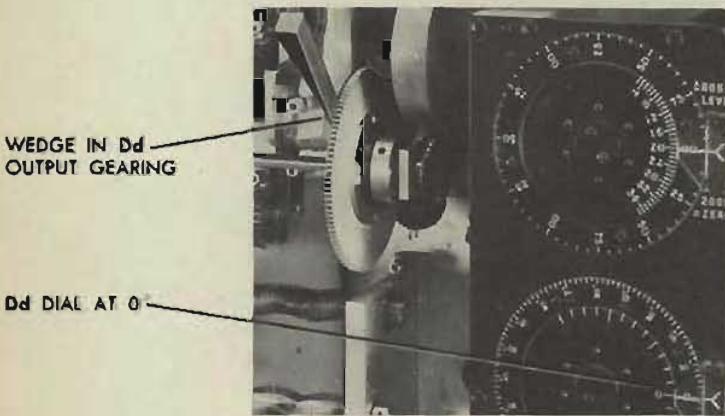
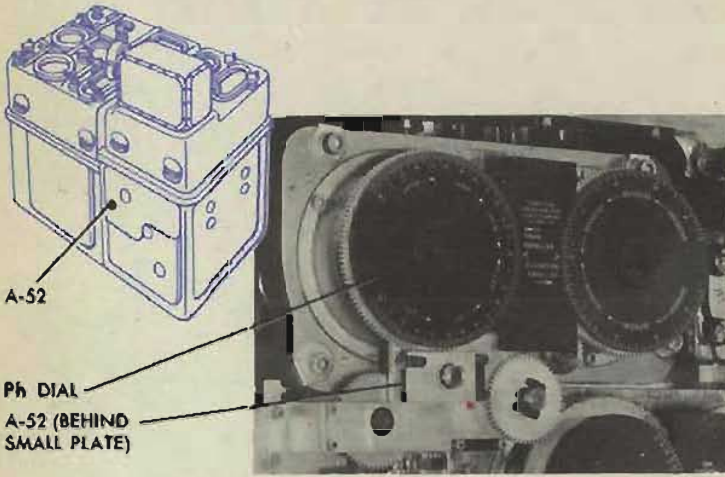
Tighten A-51 and recheck.

Readjust A-50.

Remove the wedges.



A-52 Ph DIAL to Ph COMPUTER



Location

A-52 is under cover 6, behind the small plate below the *Ph* dial.

Check

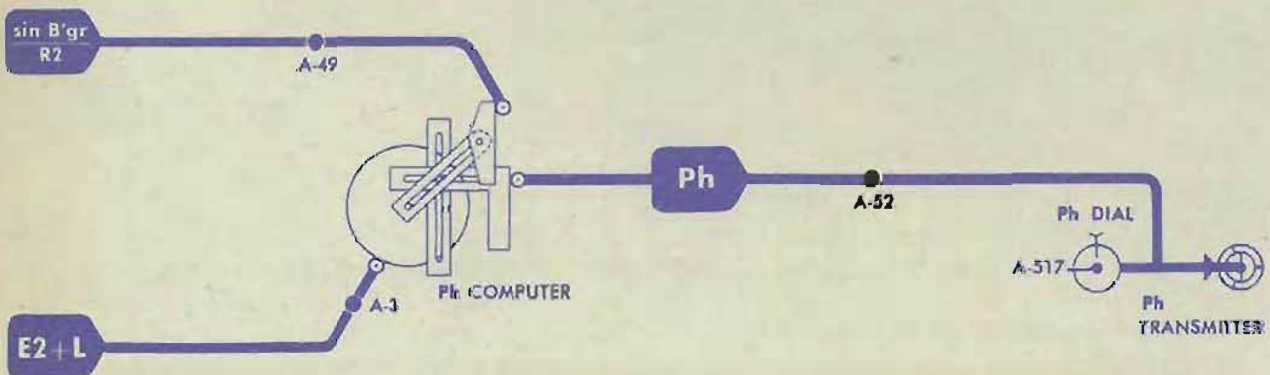
Turn the power OFF.
 Set *Dd* at 0° and wedge the line.
 Set *B'gr* at 0°.
 The *Ph* dial should read 0°.

Adjustment

If the *Ph* dial does not read 0°, check A-517. Make A-52 slip-tight. Slipping through A-52, turn the large gear on the rotor of the *Ph* transmitter until the dial is at its proper reading.

Tighten A-52 and recheck.

Remove the wedge.



A-53 ASSEMBLY CLAMP

Location

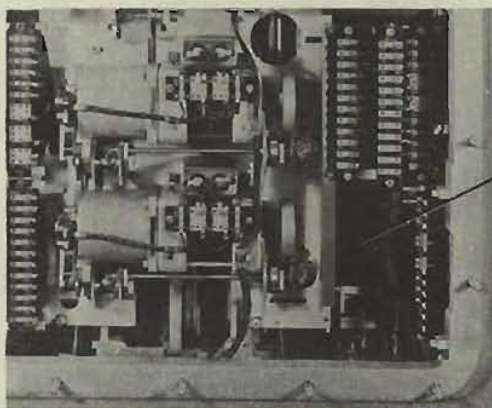
A-53 is under cover 7, on the servo output shaft of the *B'r* local control follow-up.

Check

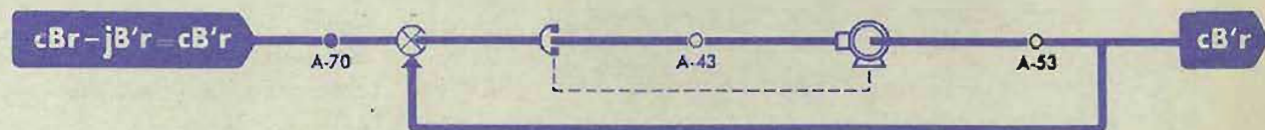
If A-53 is loose, the energized *B'r* local control servo may run without driving the *cB'r* line.

Adjustment

Tighten A-53.



B'r LOCAL CONTROL FOLLOW-UP



A-54 ASSEMBLY CLAMP

Location

A-54 is under cover 8, on the servo output shaft of the *B'r* receiver.

Check

If A-54 is loose, the *B'r* receiver servo may run without driving the *B'r* line.

Adjustment

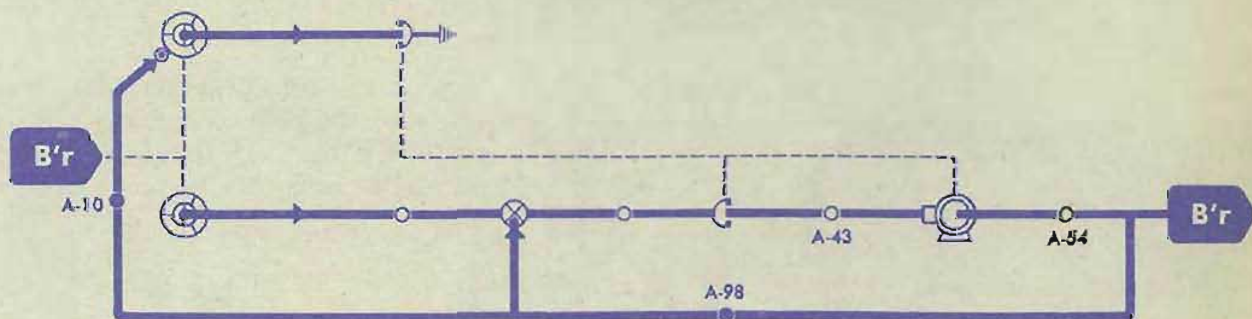
Make sure that the servo output cluster gear is in mesh. Then tighten A-54. Make sure A-209 on the magnetic damper above A-54 is also tight.

Check A-98.

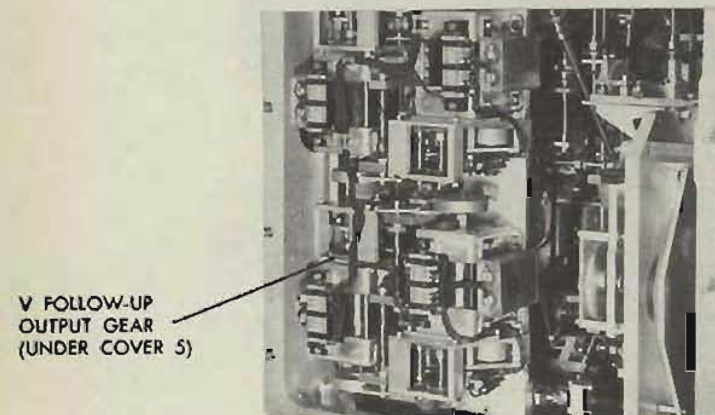
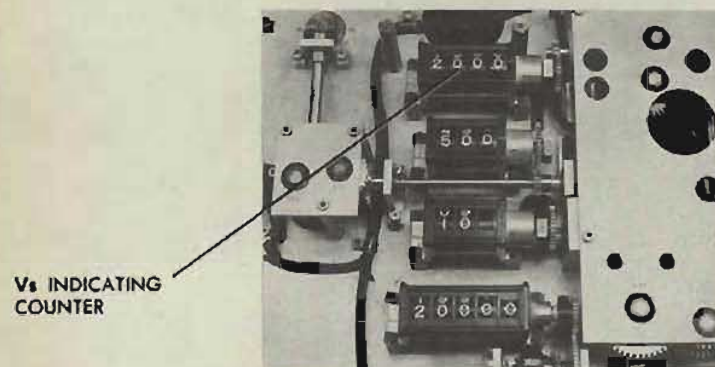
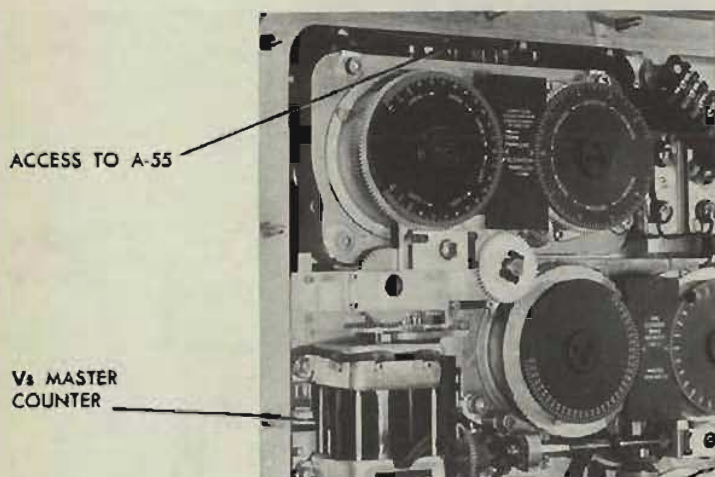


A-54

B'r SERVO MOTOR



A-55 Vs INDICATING to Vs MASTER COUNTER



Location

A-55 is under cover 6, directly in front of the Vs intermittent drive. It is reached by inserting a long screw driver through the access over the *Ph* transmitter.

The Vs indicating counter is under cover 2, beside the Vs handcrank.

The Vs master counter is under cover 6, behind the *Eb* servo motor.

Check

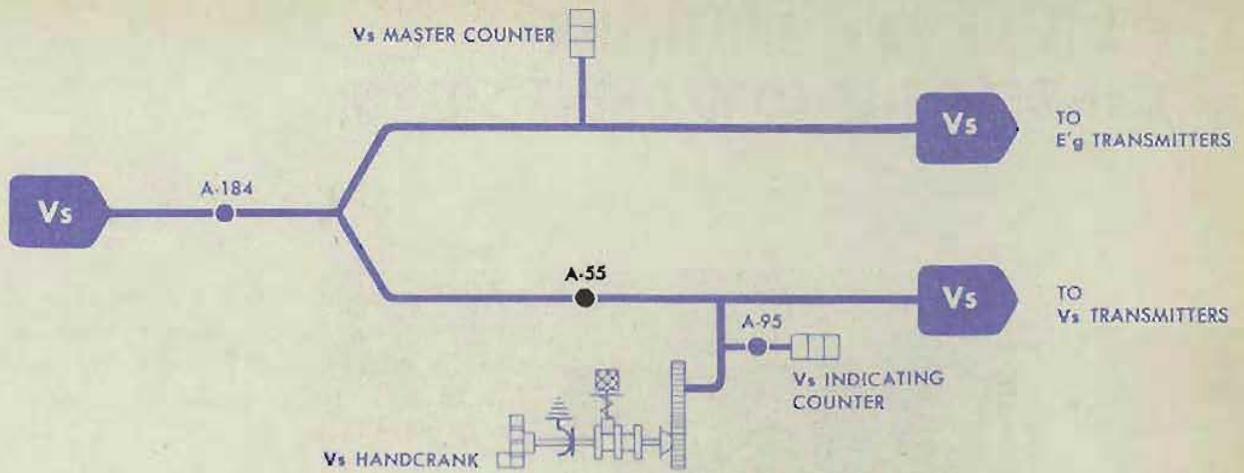
Both Vs counters should agree.

Adjustment

If the Vs counters do not agree, make A-55 slip-tight.

Turn the power ON. Hold the Vs setting with the Vs handcrank in the IN position. Turn the V follow-up output gearing to bring the Vs master counter to the same reading.

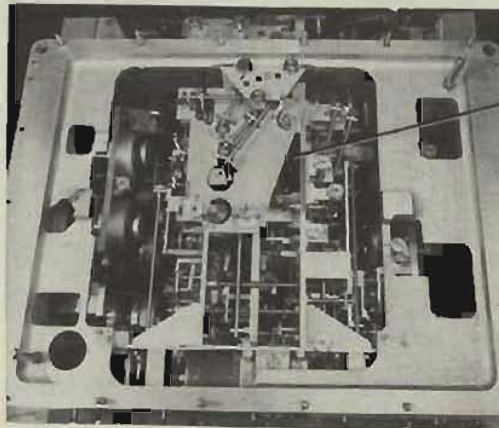
Tighten A-55 and recheck. Check A-184, A-95.



A-56 ASSEMBLY CLAMP

Location

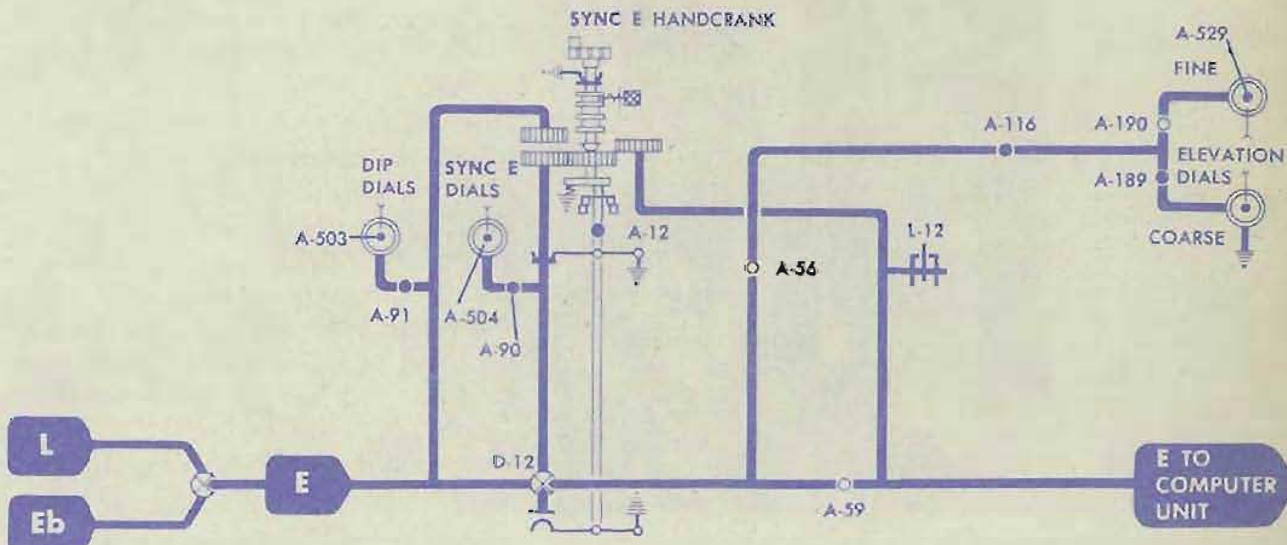
A-56 is on the *E* line at D-12 in the corrector unit. It can be reached only when the indicator unit is removed from the corrector unit. On computers with Ser. Nos. 290 and lower, A-56 is the common type of adjustment clamp. On computers with Ser. Nos. 291 and higher, it is a square clamp which closes firmly against a flat on the shaft



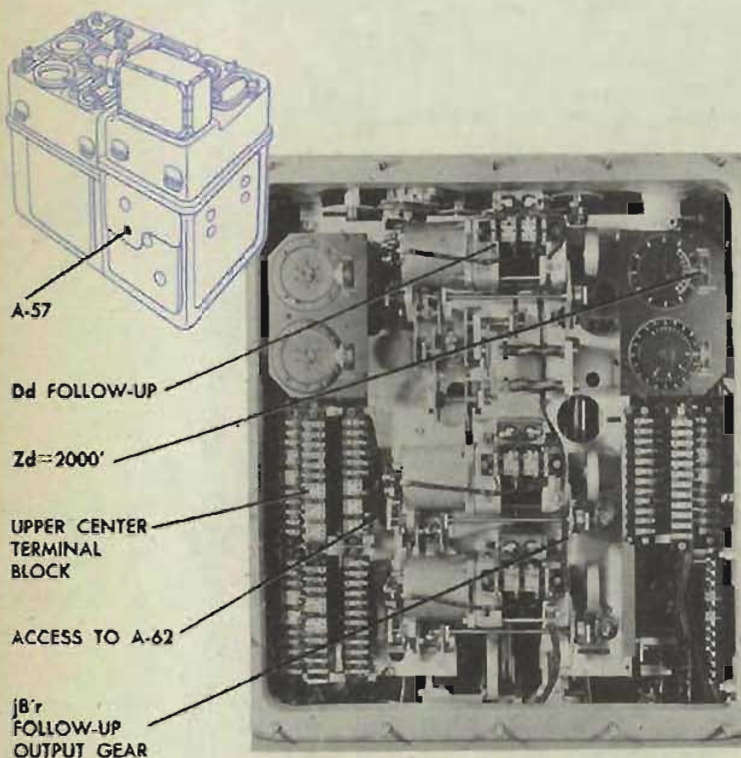
ACCESS TO A-56

Check

A-56 is checked and readjusted in the same way as A-59.



A-57 $L (L \sin 2B'r)$ MULTIPLIER to DECK TILT COMPONENT SOLVER



Location

A-57 is under cover 7. To reach it, remove the upper center terminal block near the $jB'r$ follow-up contacts. A-57 is 20 inches in from the terminal block.

Check

Set Dd at 0° .

Remove leads 1B and 1BB from the Dd follow-up and wedge the output gearing.

Turn the power ON.

Turn the control switch to LOCAL. Set Zd at 2000'.

Set $B'r$ at 0° , using the generated bearing crank.

Turn L from 800' to 3200'.

There should be no motion of the $L(L \sin 2B'r)$ output rack for the full travel of L .

Observe A-62 for motion of the output rack. If A-62 moves, A-57 is in error and should be readjusted.

Adjustment

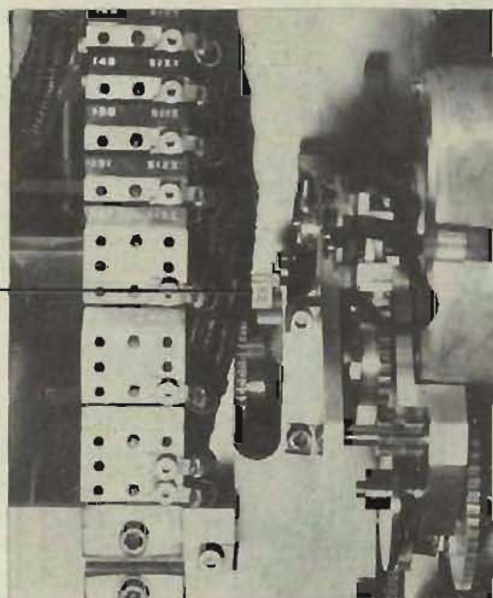
With L at 2000', mark the $jB'r$ follow-up output gear for use as an indicator. Turn L to 3200'. Make A-57 slip-tight.

WARNING: If A-57 is loosened too much, the input slide of the multiplier will fall.

With a gear pusher, turn the spur gear next to A-57 until the $jB'r$ follow-up gear is at the original mark.

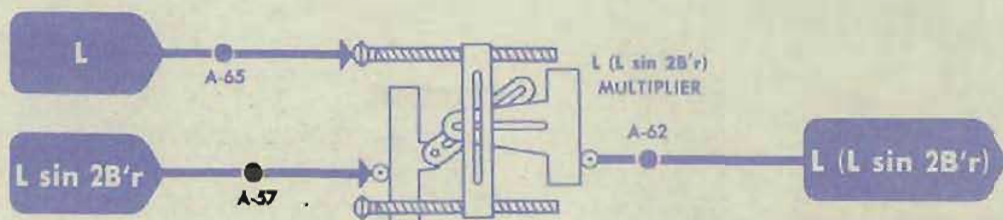
Turn L to 800' and continue the adjustment until there is no motion of the follow-up gear for full travel of L . Tighten A-57 and recheck.

Remove the wedge and replace the leads on the Dd follow-up.



REMINDER

Replace the terminal block at the left of the *jB'r* follow-up.
Check A-62.



A-58 L DIALS to L-16

Location

A-58 is under cover 6, below the lower *Eb* follow-up.

L-16 is under cover 7, in front of the *L* stub shaft to the stable element. The upper limit is at the rear.

Check

Put the sync *E* handcrank at CENTER.

Loosen A-601.

Turn the *L* line to check the readings of the computer *L* dials at the limits of L-16.

The *L* dials should read 480' at the lower limit and 3520' at the upper limit.

CAUTION

In case either limit cannot be reached, check A-28, and readjust if necessary. Check A-64, A-65, A-57, A-34, A-227 and A-3.

Determine which adjustment is in error. Loosen it and readjust later.

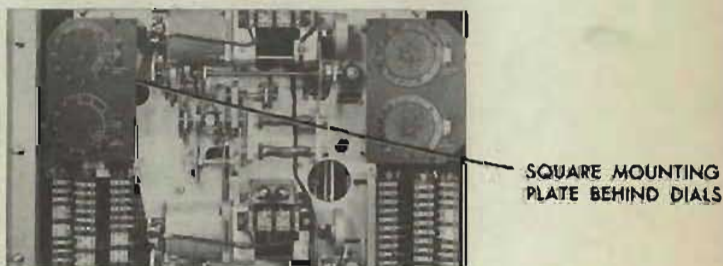
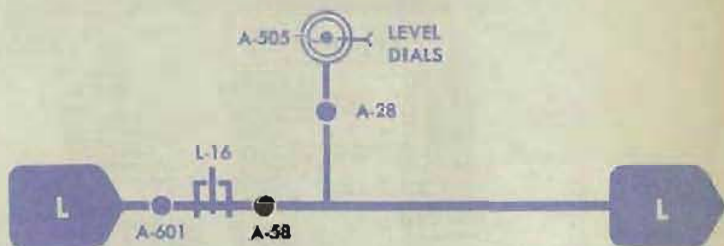
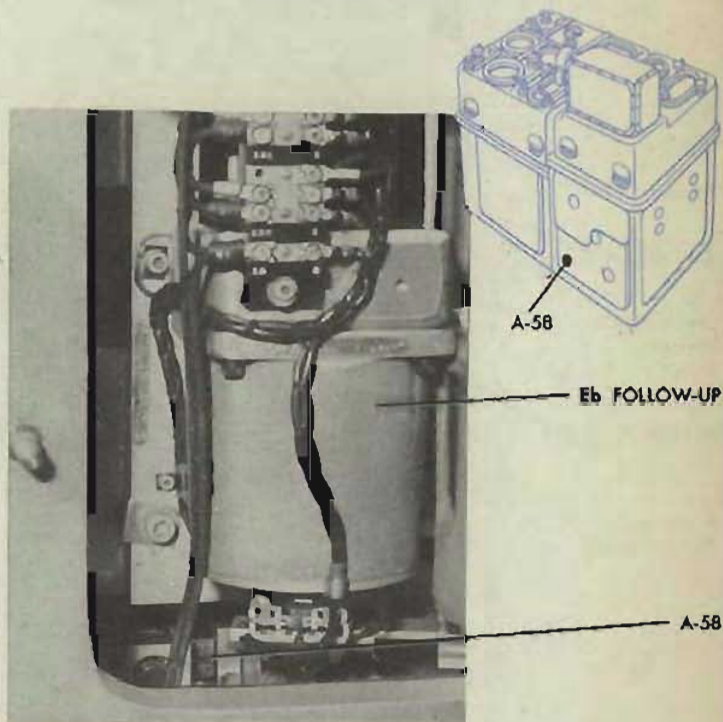
Adjustment

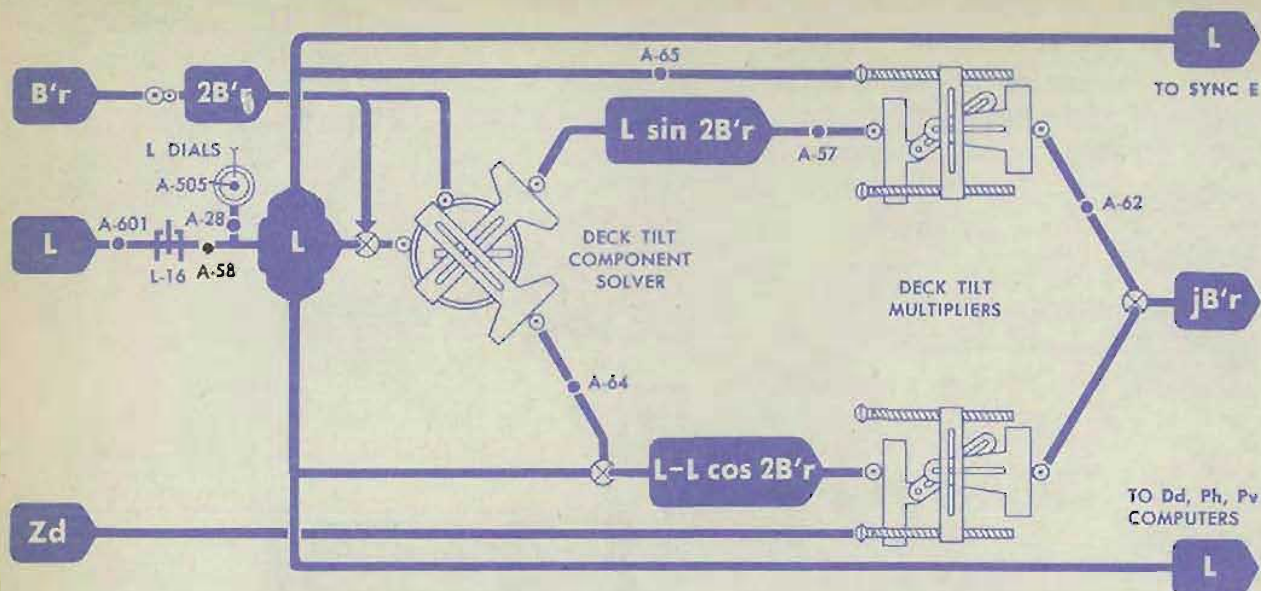
If the readings of the dials are incorrect, make A-58 slip-tight.

Hold the *L* shaft line against either limit and set the *L* dials at their proper value by turning the square mounting plate behind the *L* dials.

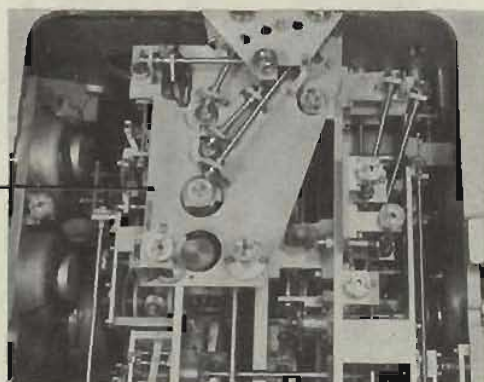
Tighten A-58 and recheck the readjustment at the other limit.

Split any error.
Readjust A-601.





A-59 ASSEMBLY CLAMP



REMOVE THIS
PLATE TO
REACH A-59

Location

A-59 is on D-12 in the *E* line in the corrector unit. It can be reached only after removal of the indicator unit and the top plate of the corrector unit. On computers with Ser. Nos. 290 and lower, A-59 is the common type of adjustment clamp. On computers with Ser. Nos. 291 and higher, it is a square clamp which closes firmly against a flat on the shaft.

Check

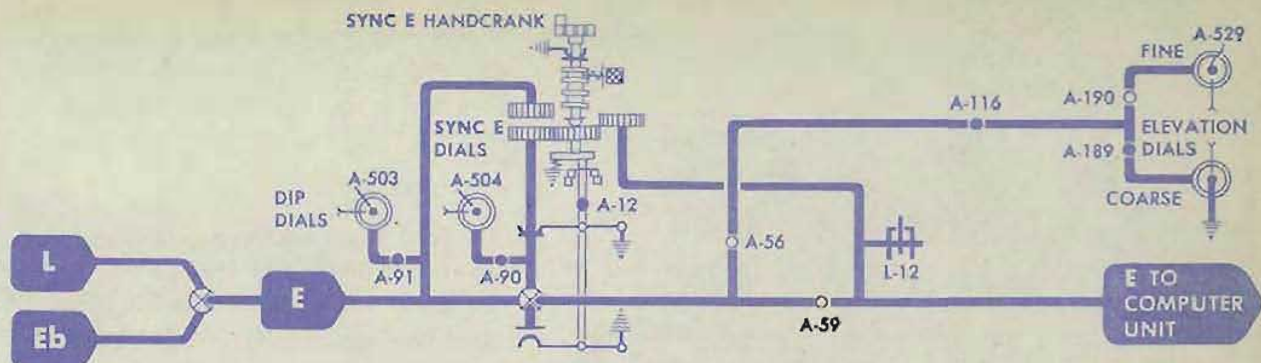
Put the sync *E* handcrank in the CENTER position.

Check that the limits of *E* are correct:
 -5° to $+85^\circ$ on Ser. Nos. 389 and lower.

-25° to $+85^\circ$ on Ser. Nos. 390 and higher.

If the limits of *E* are incorrect, check A-116 for looseness. If A-116 is tight and shows no signs of slippage, either A-56 or A-59, or both, may have slipped.

NOTE: On computers with Ser. Nos. 291 and higher, A-56 and A-59 cannot slip when properly assembled.



Adjustment

Tighten A-59 and A-56.

Reinstall the top plate and the indicator unit.

Readjust by *Factory Adjustment Procedure*, page 815.

A-60 Eb + Vs INTERMITTENT DRIVE to Eb + Vs LINE

Location

A-60 is under cover 7, on the input gear of the $Eb + Vs$ intermittent drive. It can be seen through the access hole next to the L dial mask.

Check

Set E at 80° with the sync E handcrank at CENTER. Match the sync E dials at the index, with the handcrank OUT.

Set L at 2000'.

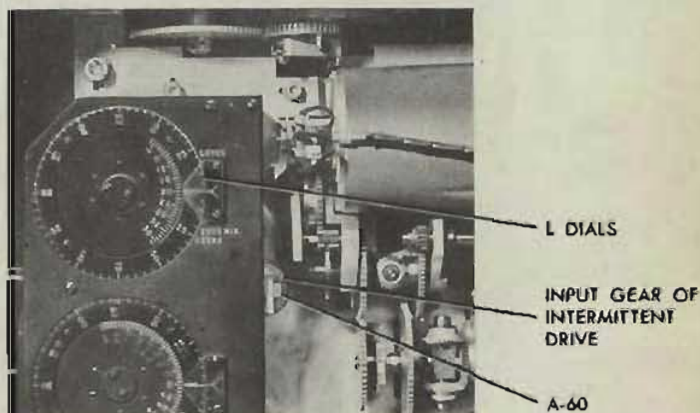
Increase Vs while observing the output gear of the intermittent drive. It should stop turning when the Vs counter reads 2360'.

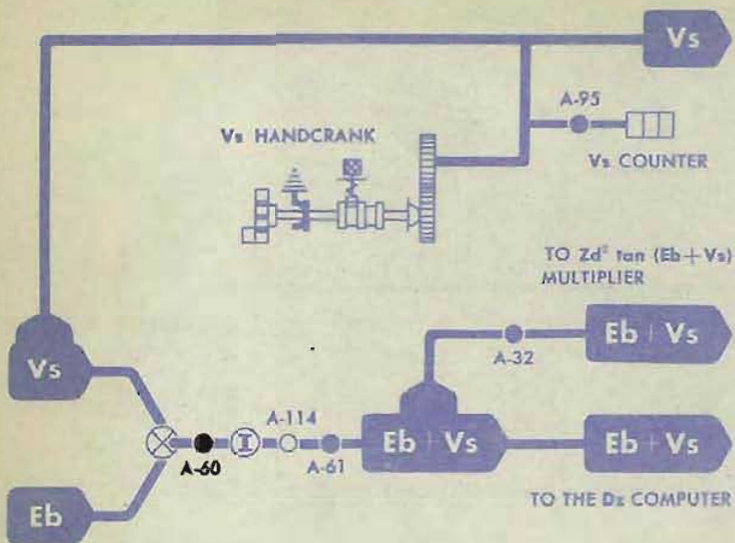
NOTE: Check that E and sync E remain as set.

Adjustment

If the intermittent drive output gear does not stop turning when Vs reads 2360', make A-60 slip-tight.

Turn Vs in an increasing direction to the point where the output gear stops turning. This is the upper cut-out point of the intermittent drive.





Use a gear pusher to hold the spider disk on the intermittent drive. Set the V_s counter to 2360' with the V_s handcrank.

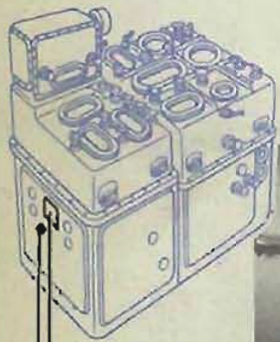
Tighten A-60.

Check at the lower cut-out point. Set E at 0° . Match the sync E dials at the fixed index. Decrease V_s .

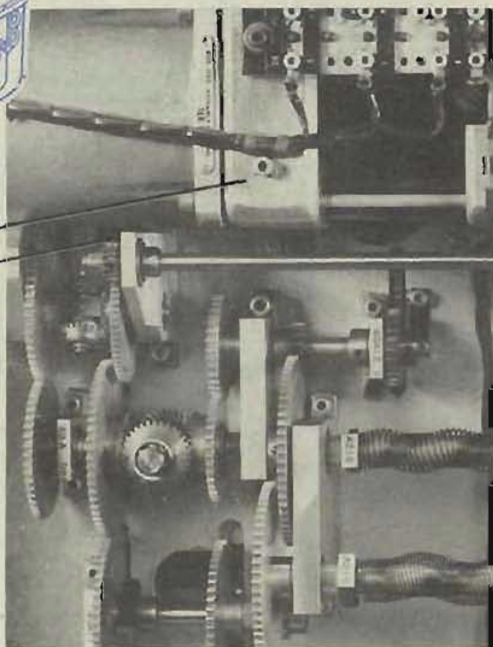
The intermittent drive should cut out when the V_s counter reads 1640'.

Check A-61 and A-32.

A-61 Dz COMPUTER to Eb + Vs LINE



Dd FOLLOW-UP
ACCESS TO A-61



Location

A-61 is under cover 7. It may be reached through the hole below the compensator assembly of the Dd follow-up.

Check

Turn the power ON.

Set L at 2000'.

Set E at 60° with the sync E handcrank at CENTER.

Match the sync E dials at the fixed index, with the handcrank OUT.

Set Ds at 500 mils.

Set V_s at 2000'.

Set Zd at 3200'.

The Dd dials should read $+30^\circ 34'$.

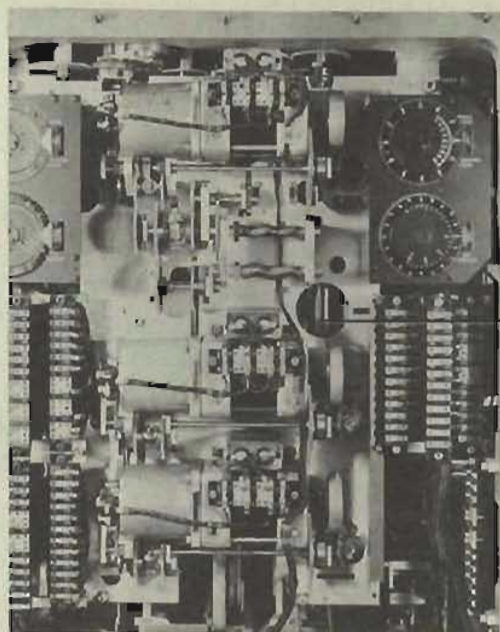
Adjustment

If the Dd dials do not read $+30^\circ 34'$, check A-35 and A-36 and readjust them if necessary.

Make A-61 slip-tight.

Turn the $E_b + V_s$ cam until the D_d dials read the proper value.

The $E_b + V_s$ cam is next to the mounting plate of the D_z computer. It can be reached by a gear pusher inserted through the hole above the $jB'r$ follow-up.



ACCESS TO $E_b + V_s$ CAM

IMPORTANT

If any interference is felt while adjusting A-61, loosen A-32.

Tighten A-61.

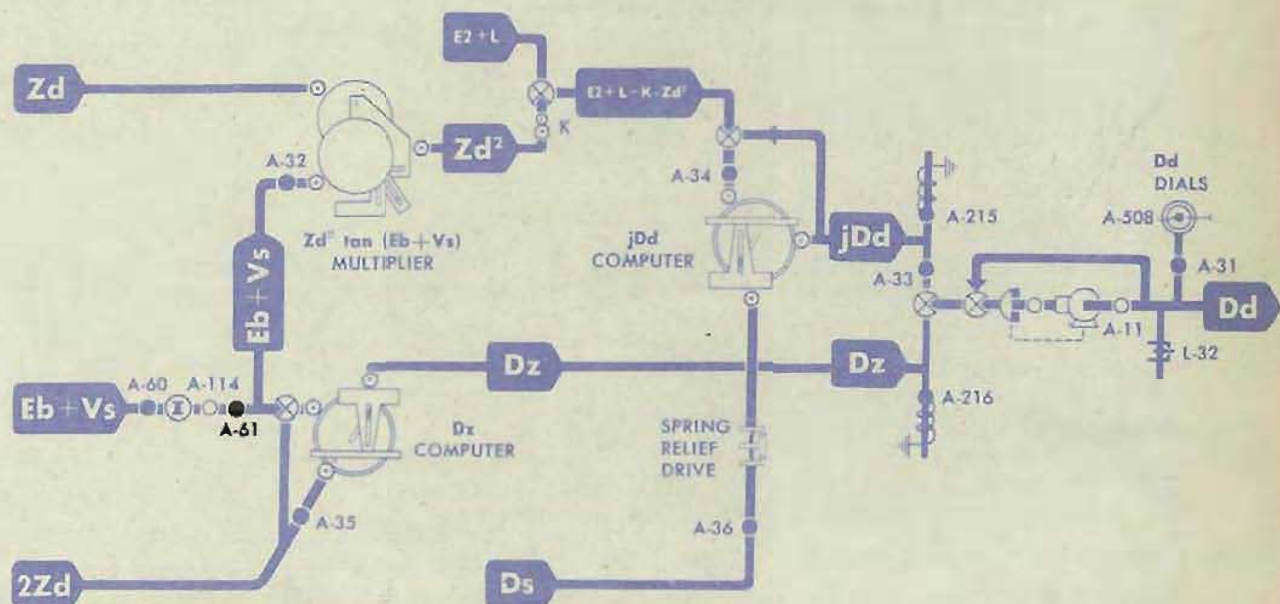
Recheck

Decrease Z_d to 800'.

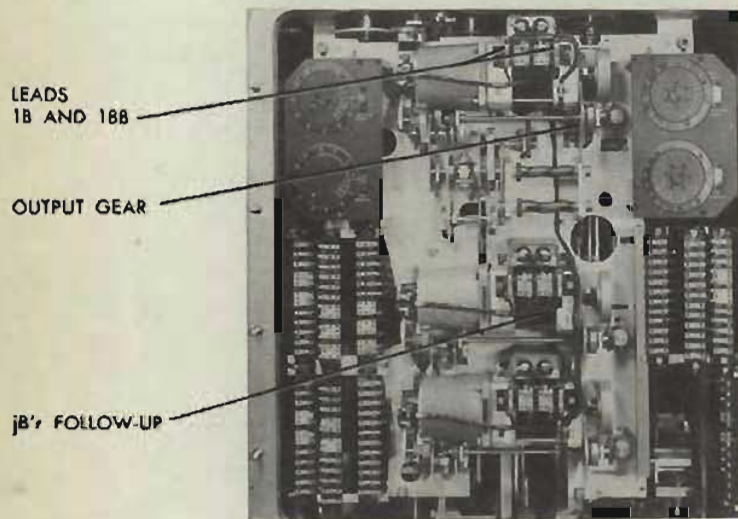
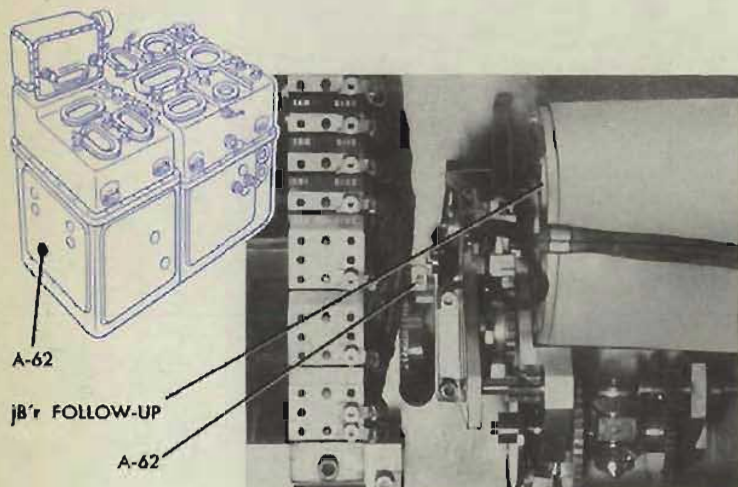
The D_d dials should read $-30^{\circ}34'$.

Split the error.

Check A-114 and A-32.



A-62 SYNCHRONIZING THE jB'r FOLLOW-UP



Location

A-62 is under cover 7. It is reached through a hole next to the contacts of the jB'r follow-up.

Check

At the switchboard, turn the B'r receiver switch OFF.

Set Dd at 0°.

Remove leads 1B and 1BB from the Dd follow-up, and wedge the output gearing.

Turn the power ON.

Set L and Zd at 2000'.

Set B'gr at 0°, and wedge the line.

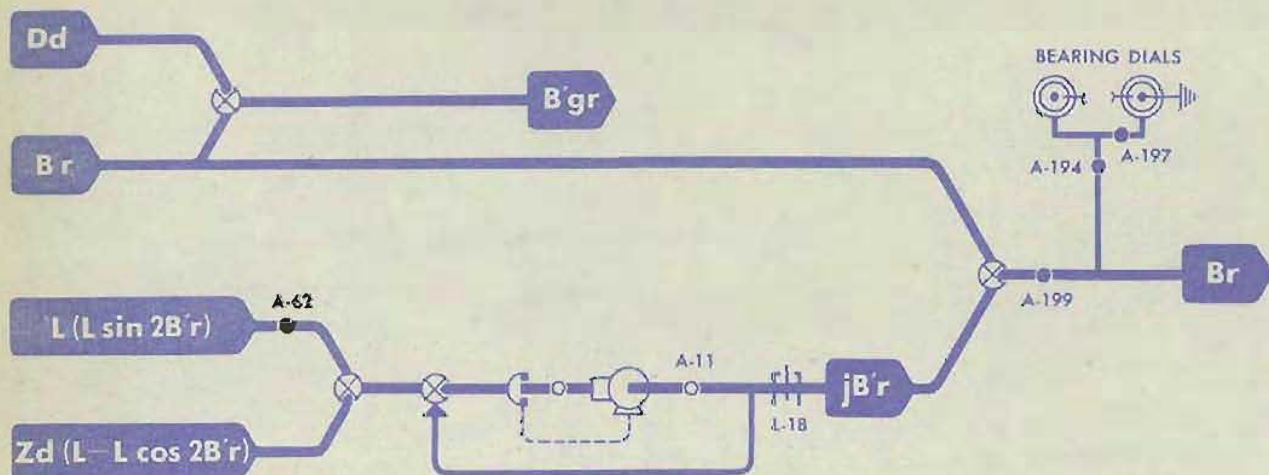
The Br dials should read 0°.

Adjustment

If the Br dials do not read 0°, check A-199. Make A-62 slip-tight. Use a gear pusher to turn the spur gear at the rear of A-62 until the jB'r follow-up drives the Br dials to 0°.

Tighten A-62, and recheck.

Remove all wedges and replace the Dd power leads.



A-63 SYNCHRONIZING THE Vz FOLLOW-UP

Location

A-63 is under cover 7. It is reached through the small hole below the Vz follow-up.

Check

Turn the power ON.

Set *L* at 2000'.

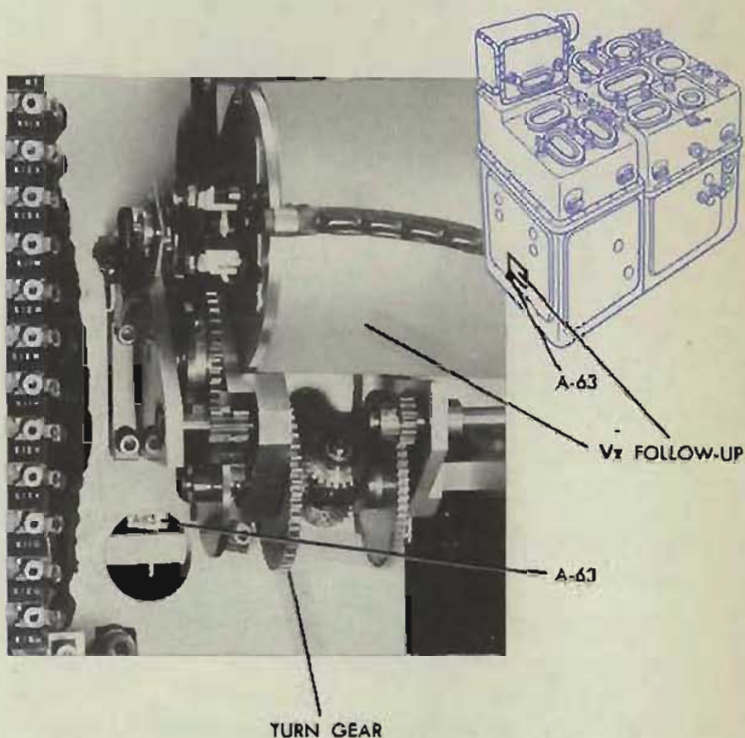
Set *E* at 0° with the sync *E* handcrank at CENTER and match the sync *E* dials at the index with the handcrank OUT.

Set *Zd* at 2000'.

Set *Ds* at 500 mils.

Set *Vs* at 2000'.

The *Vz* dials should read 0'.

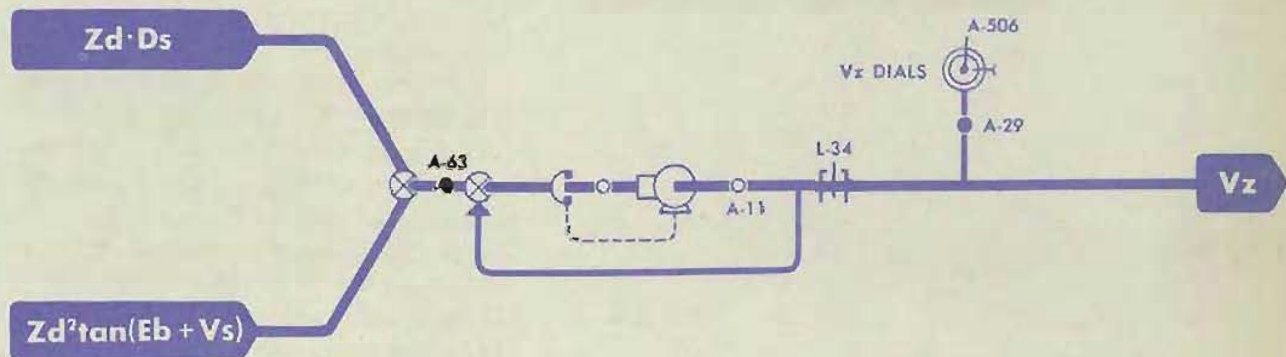


Adjustment

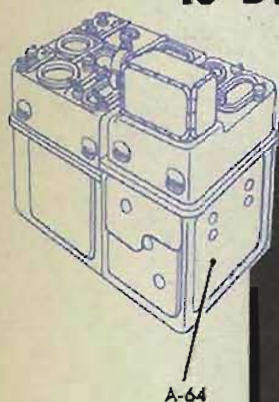
If the *Vz* dials do not read 0', make A-63 slip-tight.

Turn the left side gear of the differential, below the *Vz* compensator assembly, until the *Vz* dials read 0'.

Tighten A-63 and recheck.



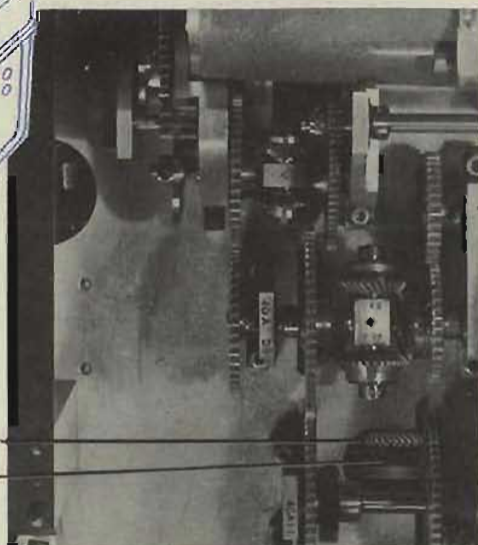
A-64 $Z_d (L - L \cos 2B'r)$ MULTIPLIER to DECK TILT COMPONENT SOLVER



A-64

BEVEL GEAR

A-64

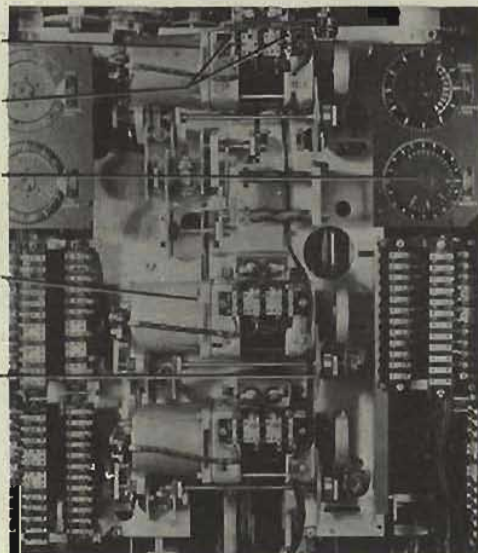


Dd FOLLOW-UP

1B AND 1BB
LEADS

Dd DIALS

jB'r FOLLOW-UP

LARGE OUTPUT
GEAR.

Location

A-64 is under cover 7. It is visible through the hole above the $jB'r$ follow-up motor.

Check

Set Dd at 0° .

Disconnect leads 1B and 1BB from the Dd follow-up. Wedge the output gearing.

Turn the power ON.

Turn the control switch to LOCAL.

Set the computer L dials at $2000'$.

Use the generated bearing crank to set $B'gr$ at 45° .

Turn Z_d from $800'$ to $3200'$. The $L - L \cos 2B'r$ slide should be at its zero position, the position at which there is no movement of the output slide when Z_d is turned from $800'$ to $3200'$.

Observe the large output gear on the $jB'r$ follow-up to note any movement of the output slide.

Adjustment

If there is movement during the full travel of Z_d , make A-64 slip-tight.

WARNING: If A-64 is completely loosened, the input slide will fall.

Set Z_d at $2000'$ and mark the $jB'r$ follow-up output gear.

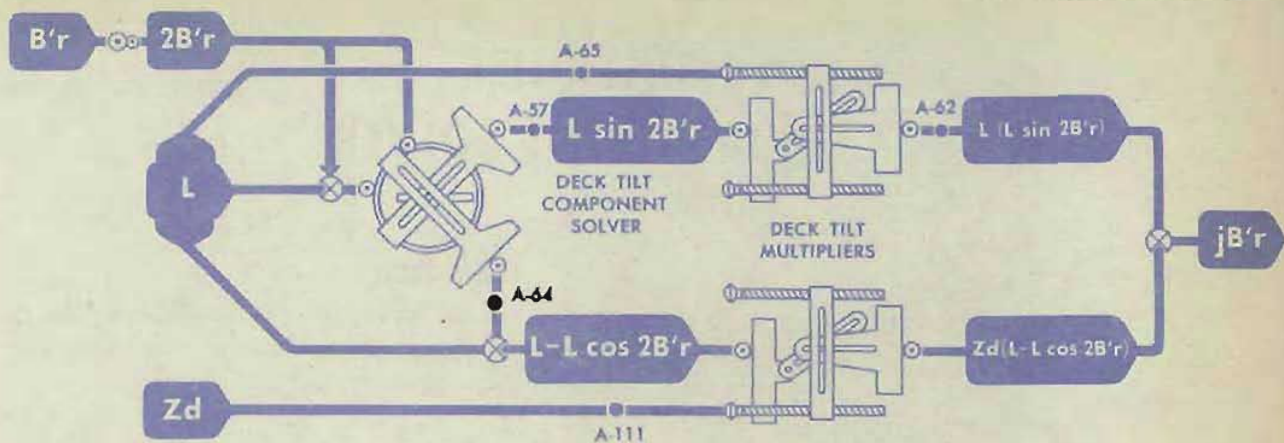
Turn Z_d to $3200'$.

Use a gear pusher to turn the bevel gear above A-64 until the follow-up output gear has returned to its original mark. Tighten A-64 and recheck by turning Z_d from $800'$ to $3200'$.

There should be no motion of the $jB'r$ follow-up.

Remove all wedges and replace the Dd follow-up power leads.

Check A-62.



A-65 L (L sin 2B'r) MULTIPLIER to L DIALS

Location

A-65 is a large clamp under cover 6, 8 inches from the bottom and 10 inches in, directly behind the *Eb* follow-up.

Check

A-57 must be loosened before A-65 can be checked.

Set *L* at 2000'.

Make A-57 slip-tight. See readjustment of A-57.

Use a long gear-pusher to move the *L sin 2B'r* input rack from limit to limit. Push the gear just behind the A-57 gear.

There should be no motion of the *jB'r* follow-up for full travel of the *L sin 2B'r* input rack.

Adjustment

If there is movement of the *jB'r* follow-up, A-65 is in error.

Move the *L sin 2B'r* input rack to one limit.

Mark the *jB'r* follow-up output friction gear for use as an indicator.

Move the *L sin 2B'r* input rack to the other limit.

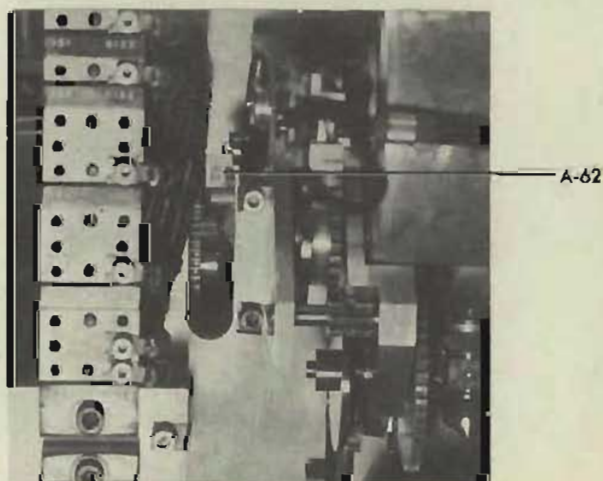
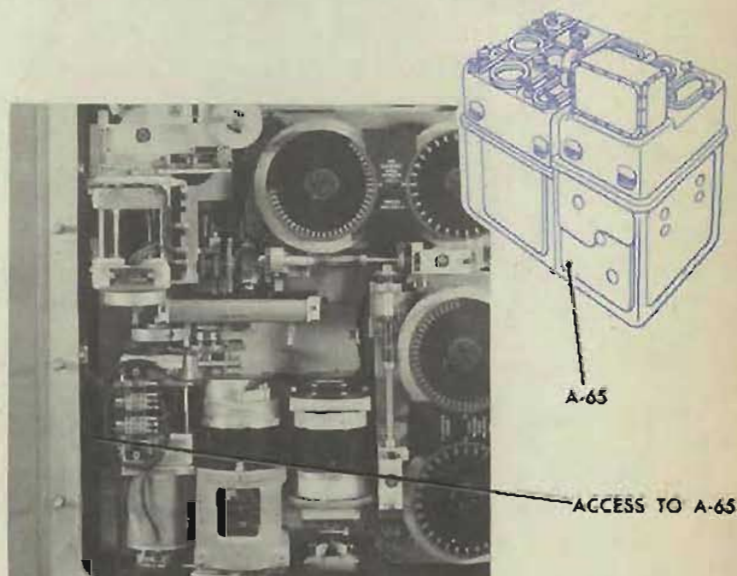
Loosen A-65 and turn the gear next to it to correct halfway.

Make new indicating marks. Continue adjusting until there is no motion of the *jB'r* follow-up for full travel of the *L sin 2B'r* input rack.

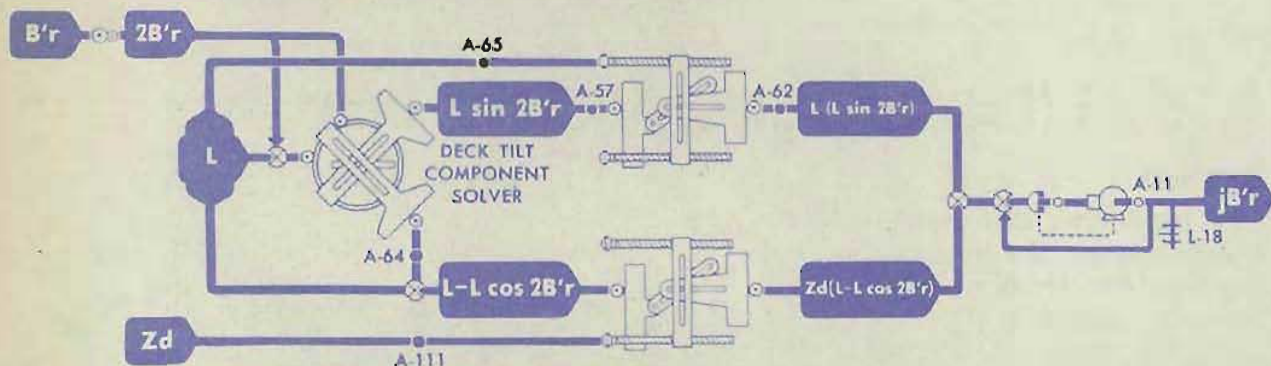
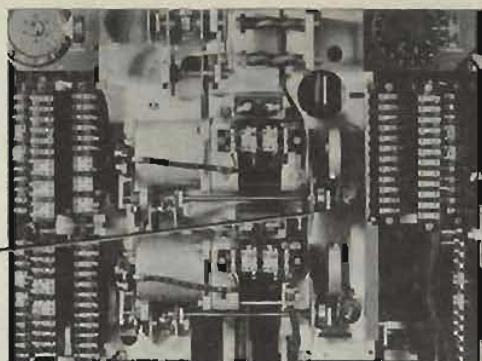
Tighten A-65 and recheck.

Readjust A-57.

Check A-62.



jB'r FOLLOW-UP
OUTPUT GEAR



A-66 D_s SINGLE-SPEED TRANSMITTER to D_s COUNTER

Location

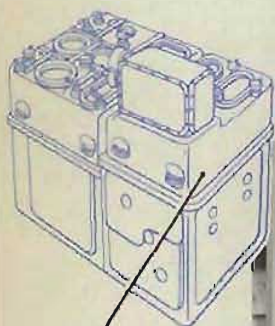
A-66 is under cover 2. A-66 is omitted on Mods 1, 3, 4, 8, and 12.

Check

Set the D_s counter at 500 mils. The D_s transmitter should be on electrical zero. When the transmitter is on electrical zero, the scribe mark on the rotor gear should match the fixed index.

Adjustment

If the transmitter is not on electrical zero, make A-66 slip-tight. Hold D_s at 500. Turn the gear below A-66 until the scribe mark matches the fixed index. Tighten A-66, and recheck. Check A-114, A-94, and A-96.



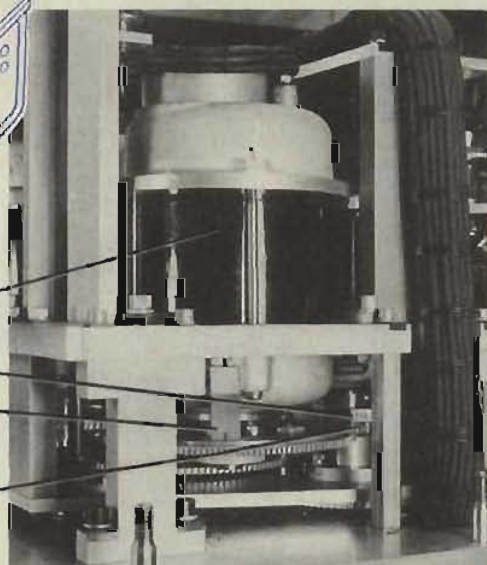
A-66

D_s SINGLE-SPEED
TRANSMITTER

A-66

FIXED INDEX

GEAR BELOW A-66



A-67 COARSE to FINE SYNCHRO— F TRANSMITTER

Location

A-67 is under cover 2, at the right front

Check

Set the coarse *F* synchro on electrical zero by turning the *F* input gear. This should also position the fine *F* synchro on electrical zero. When the coarse and fine synchros are on electrical zero, the scribe marks on their rotor gears should be matched with the fixed index marks.

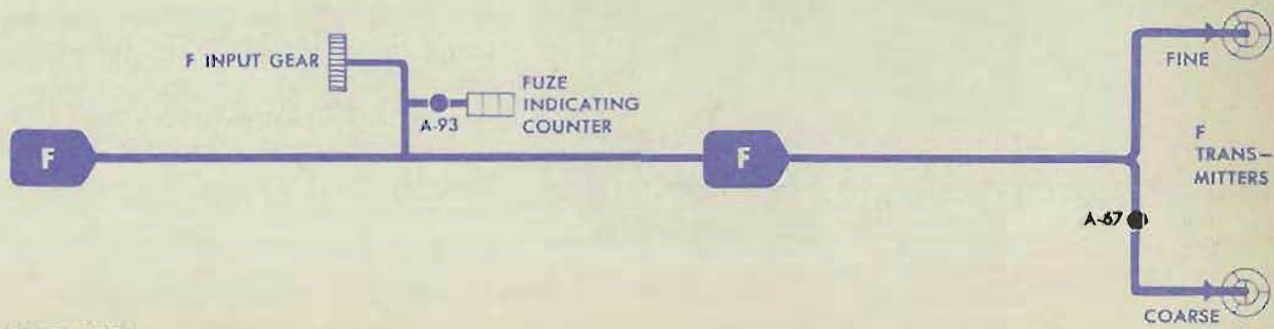
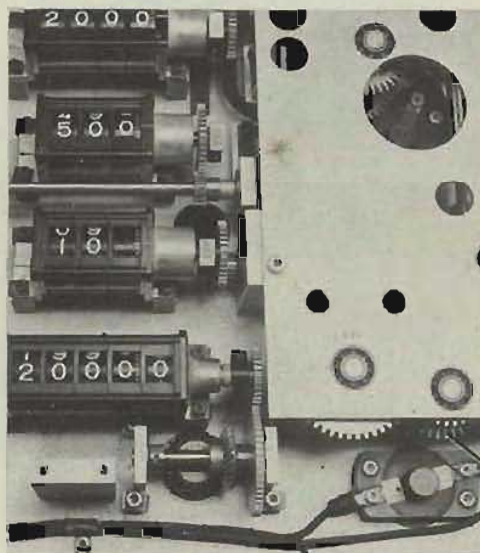
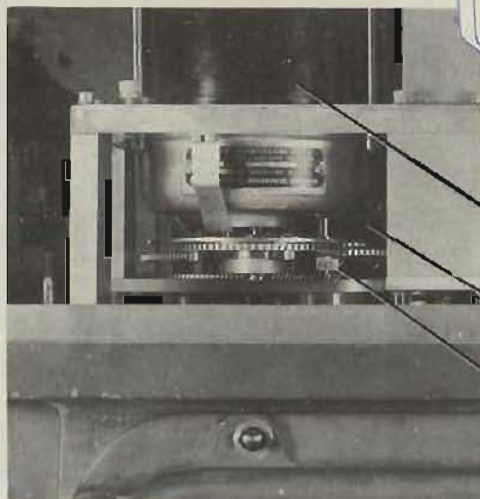
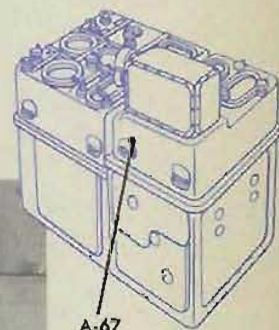
Adjustment

If the rotor of the fine *F* synchro is not on electrical zero, make A-67 slip-tight.

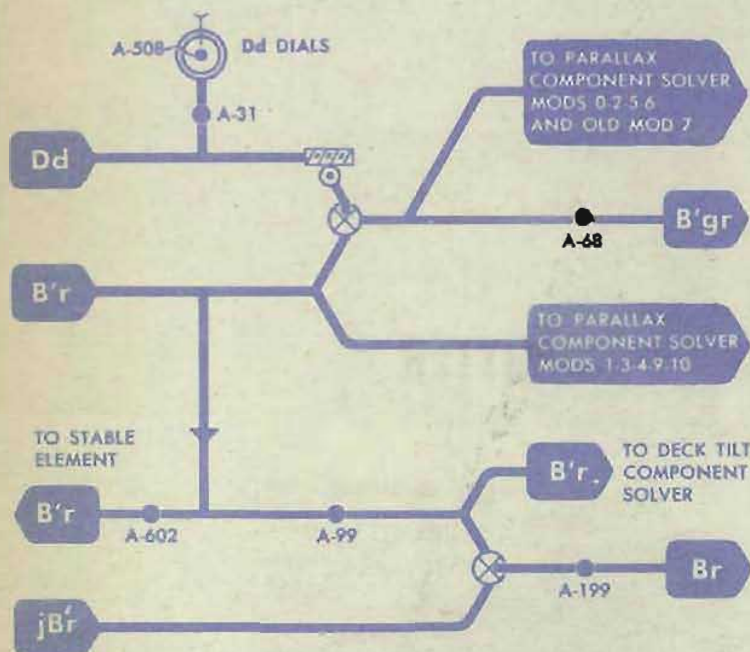
Hold the large gear on the coarse *F* synchro rotor shaft. This will keep the coarse synchro on electrical zero.

Turn the *F* input gear until the rotor of the fine synchro is at electrical zero. Check that the scribe mark on the rotor gear of the coarse synchro still matches its fixed index.

Tighten A-67, and recheck.
Check A-93.



A-68 B'gr DIALS to PARALLAX COMPONENT SOLVER (SER. NOS. 215 and LOWER)



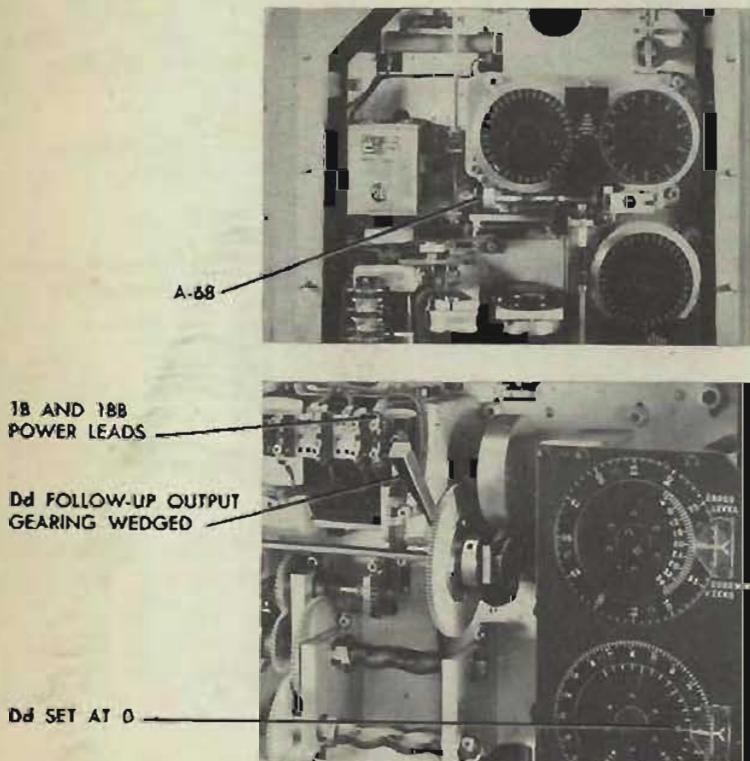
Location

A-68 is under cover 8, on the B'gr transmitter gearing.

Check

On instruments with Ser. Nos. 215 and lower, A-68 is used to adjust the B'gr dials to the parallax component solver. The check and readjustment for A-68 is the same as that given for A-243 on later instruments. Refer to the readjustment of A-243. After re-adjusting A-68, check A-99.

A-68 ASSEMBLY CLAMP (SER. NOS. 216 and HIGHER)



Check

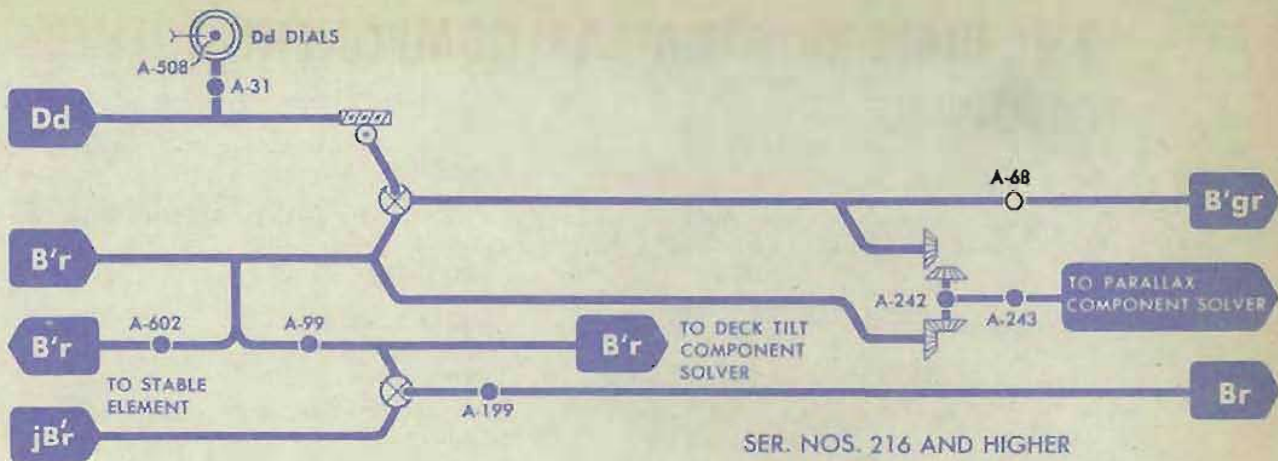
On instruments with Ser. Nos. 216 and higher, check A-243 and A-99. If one checks correctly, but the other does not, correct the one in error. If both are out of adjustment by an equal amount on the B'gr dials, A-68 is upset and should be readjusted.

Adjustment

Disconnect leads 1B and 1BB from the Dd servo. Wedge the output gearing when the Dd dials read 0. Turn the power ON. Turn the control switch to LOCAL. Use the generated bearing crank to set B'r at 0°, on the stable element dials.

Loosen A-68. Turn the worm below the B'gr transmitter dials to bring the B'gr dials to 0°. Split the lost motion and tighten A-68.

Recheck A-243 and A-99.



A-69 Vs SINGLE-SPEED TRANSMITTER to Vs COUNTER

Location

A-69 is under cover 7, behind the plate, near the top of the section. It is on the stub shaft below a large spur gear.

A-69 is omitted on Mods 1, 3, 4, 8, and 12.

Check

Remove cover 2.

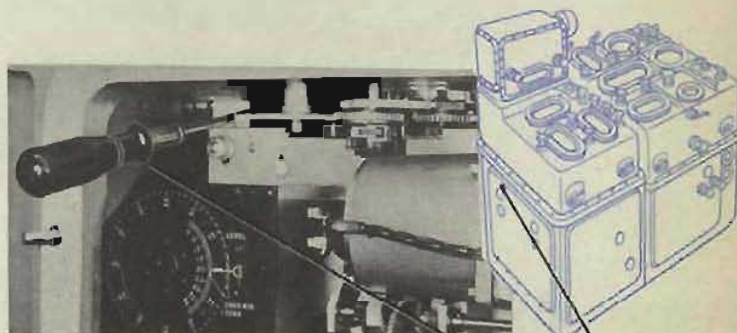
Set the Vs counter at 2000' by turning the Vs input gear.

The rotor of the Vs single-speed transmitter synchro should be at electrical zero. When the synchro is at electrical zero, the scribe mark on the rotor gear should match the fixed index.

Adjustment

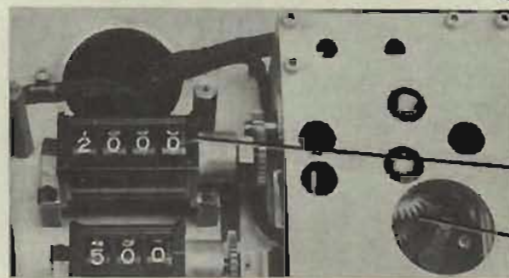
If the synchro is not on electrical zero, make A-69 slip-tight. Hold Vs at 2000'. Turn the large gear on the rotor of the synchro until the scribe mark matches the fixed index.

Tighten A-69 and recheck.



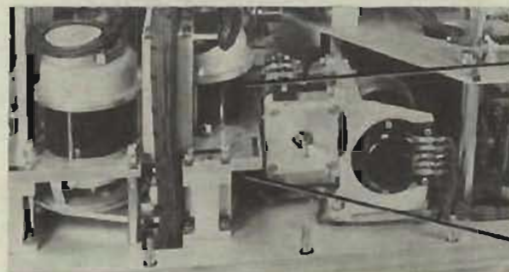
A-69

SCREW DRIVER INSERTED IN A-69



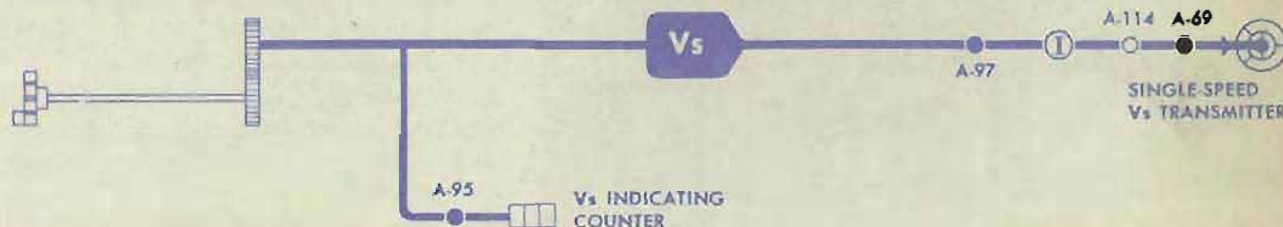
Vs COUNTER

Vs INPUT GEAR

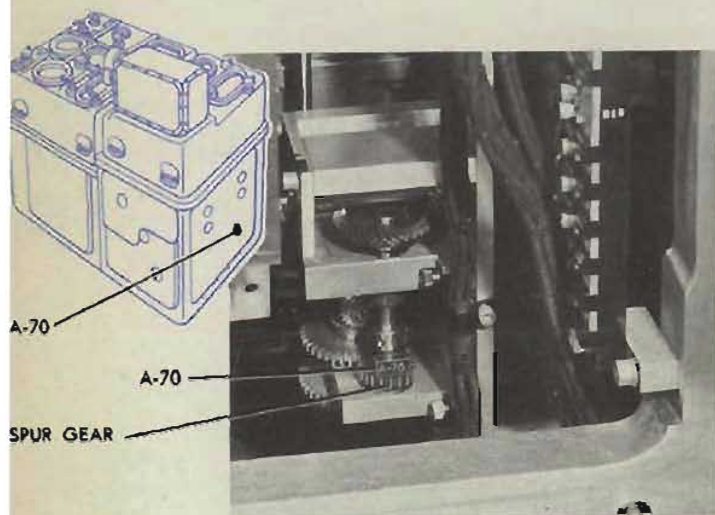


Vs SINGLE-SPEED TRANSMITTER

INDEX BELOW PLATE ON ROTOR GEAR



A-70 SYNCHRONIZING THE B'r LOCAL CONTROL FOLLOW-UP



Location

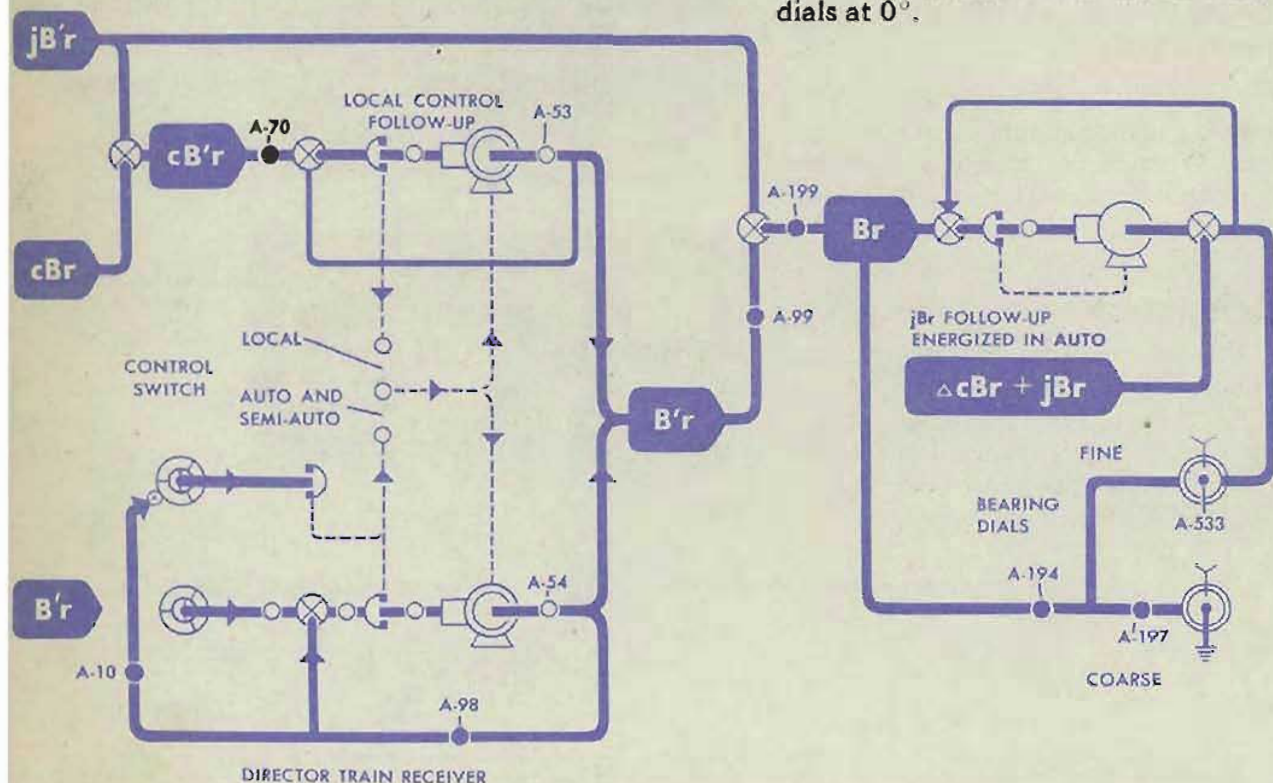
A-70 is under cover 7, in line with the *Zd* input shaft.

Check

Turn the power ON.
 Turn the control switch to LOCAL to energize the *B'r* local control follow-up.
 At the switchboard, turn the director train receiver switch OFF.
 Turn the control switch to AUTO.
 There should be no motion of the inner bearing dial.
 If the inner bearing dial moves when the control switch is turned from LOCAL to AUTO, the *B'r* local control follow-up is not properly adjusted.

Adjustment

Make A-70 slip-tight.
 Turn the control switch to LOCAL.
 Turn the generated bearing crank in its OUT position to set the *Br* ring dials at 0°.



Turn the control switch to AUTO. After the inner dial stops, turn the control switch back to LOCAL. Turn the spur gear below A-70 to put the ring dials back to 0°. Tighten A-70. Check by turning the control switch back and forth between AUTO and LOCAL, making sure that B'r is cut off at the fire control switchboard. Check A-533.

A-71 Tf/R2 BALLISTIC COMPUTER to E2 MASTER COUNTER

Location

A-71 is under cover 4.

The E2 master counter is directly below the E2 counter in the Tf/R2 ballistic computer.

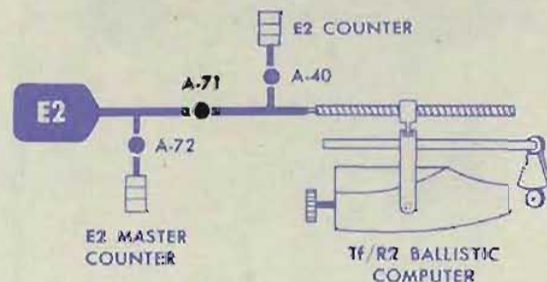
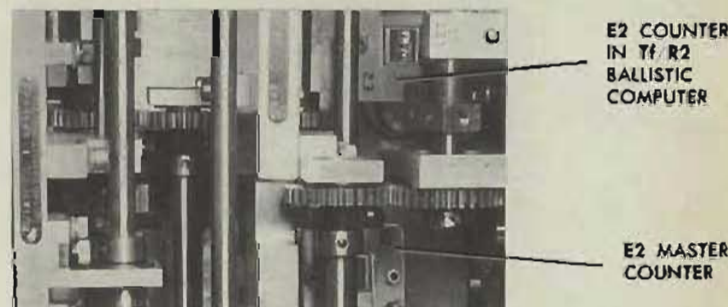
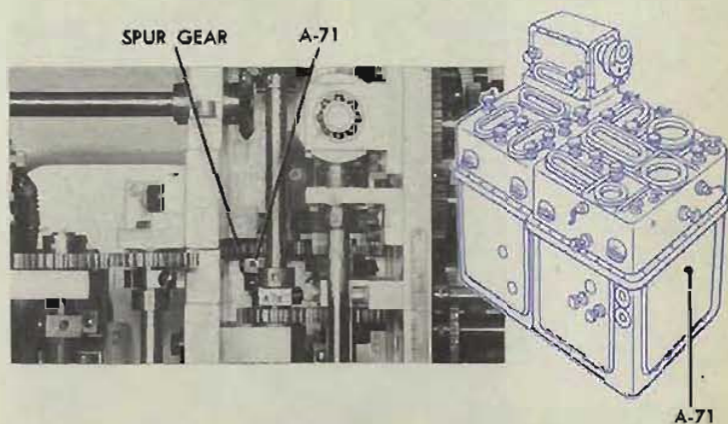
Check

Both E2 counters should agree.

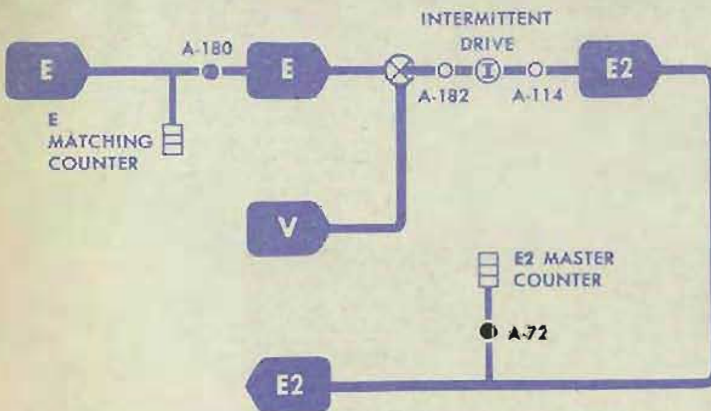
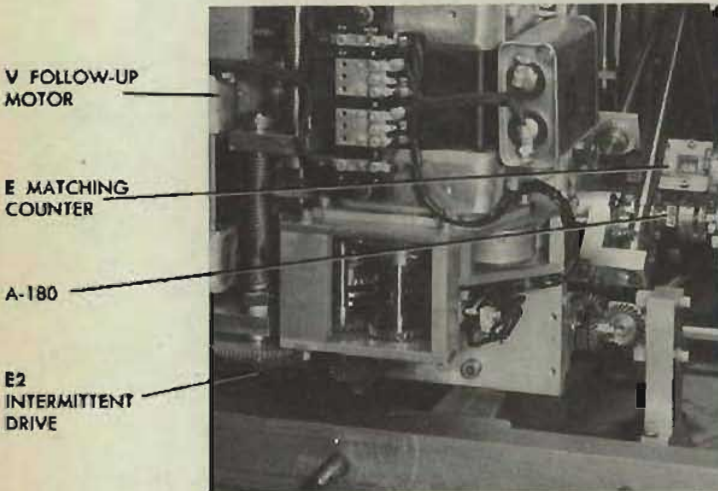
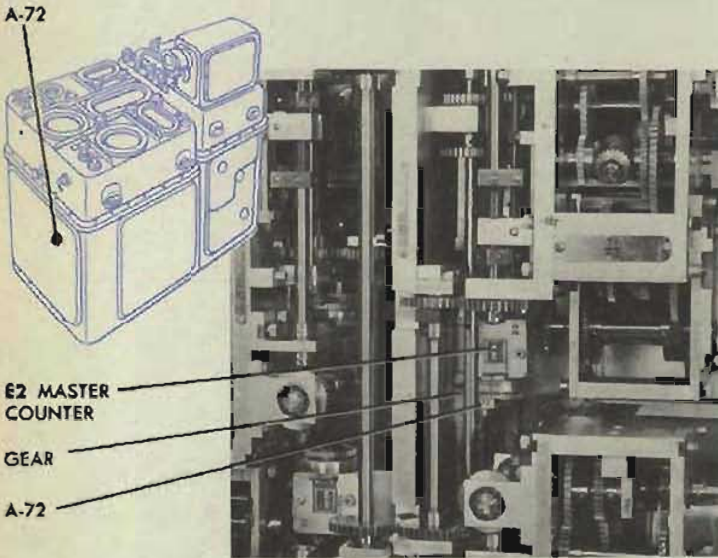
Adjustment

If the counters do not agree, make A-71 slip-tight. Hold the master counter, and turn the spur gear above A-71 to make the counter in the ballistic computer agree.

Tighten A-71 and recheck.



A-72 E2 MASTER COUNTER to E2 INTERMITTENT DRIVE.



Location

A-72 is under cover 4, at the upper left of the fuze ballistic computer, below the E2 master counter.

The E2 intermittent drive is under cover 5, behind the lower front corner of the V follow-up mounting plate.

Check

Set Vs at 2000'.
Use the sync E handcrank in its CENTER position to decrease E until the E2 master counter stops turning. When the master counter stops turning, the E2 intermittent drive has reached its low cut-out point. The E2 counter reading should be 0°.

Adjustment

If the E2 counter reading at the lower cut-out point is not 0°, loosen A-72. Use a gear pusher to turn the gear above the clamp, until the counter reads 0°. Tighten A-72.

Recheck

Increase E and Vs until the E2 counter stops turning. This is the high cut-out point of the intermittent drive. The E2 counter should read 90°.

IMPORTANT

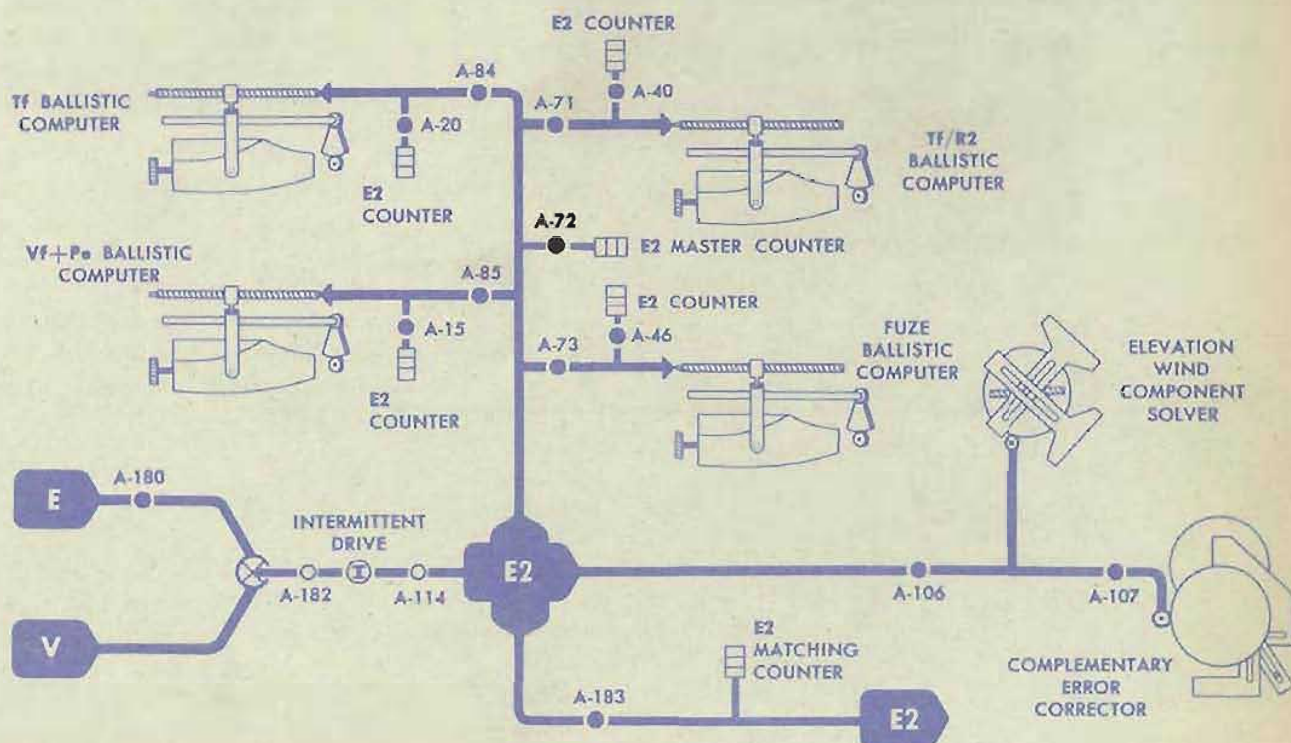
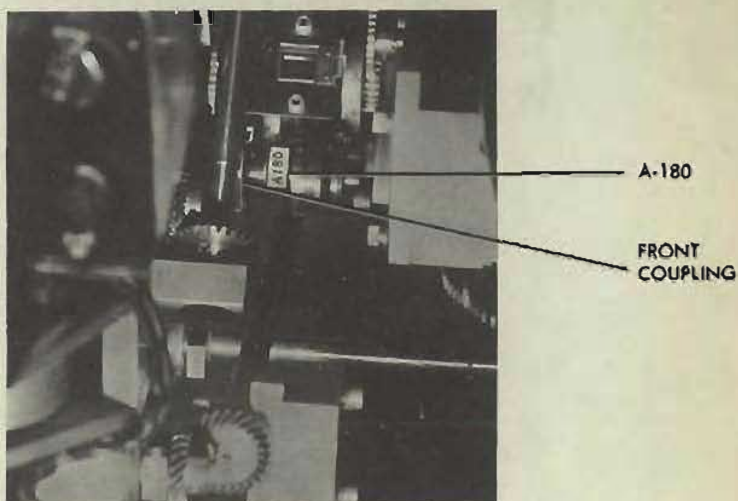
1 If the limit stops on the E and V lines operate before the low cut-out point of the intermittent drive is reached, loosen A-180. Hold the coupling at the front of the clamp and increase E to 85°.

Tighten A-180 and decrease *E* until the intermittent drive reaches its low cut-out point. If the cut-out point still cannot be reached, this procedure may have to be repeated several times.

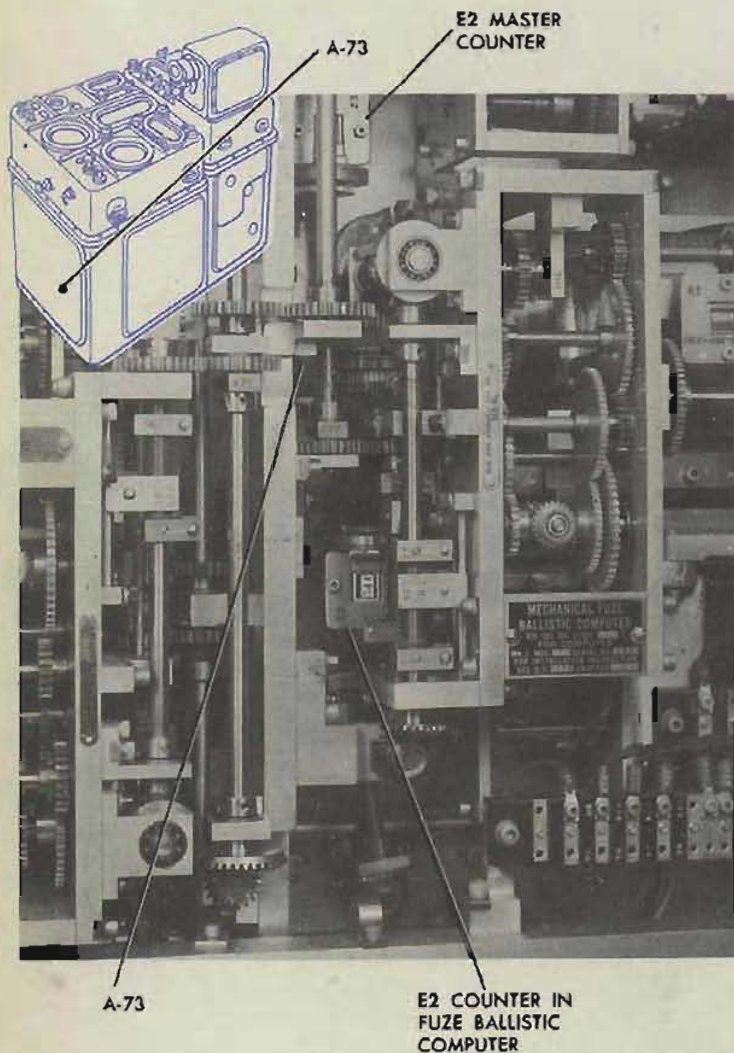
A-180 is located under cover 5, on the coupling immediately below the *E* matching counter.

- 2 If interference on the *E2* line keeps the intermittent drive from reaching either limit, check A-85, A-73, A-71, and A-84 (the *E2* lead screw inputs of the four ballistic computers). Check A-107 (the *E2* cam of the complementary error corrector). Check A-106 (the vector gear of the elevation wind component solver). Check A-183 (the *E2* line to the parallax and trunnion tilt sections). Determine which clamp is causing the restriction and loosen it.

Readjust A-180 and any other clamps that were loosened. Check A-182, A-114, A-71, A-73, A-84, A-85, A-106, A-107, and A-183.



A-73 F BALLISTIC COMPUTER to E2 MASTER COUNTER



Location

A-73 is under cover 4, between the $Vl + Pe$ and the fuze ballistic computers, behind clamp A-77.

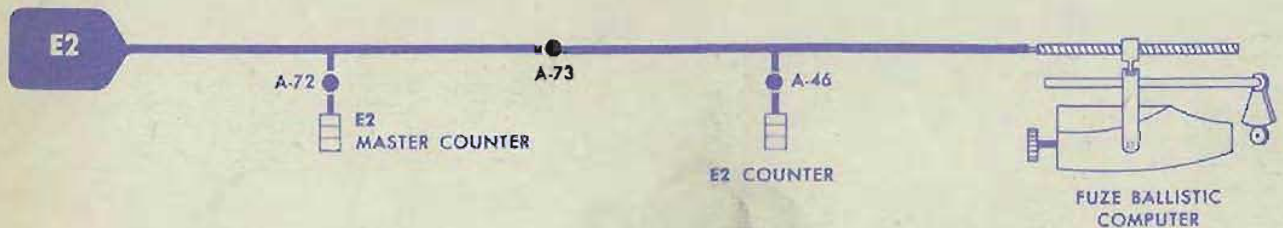
Check

The *E2* counter in the fuze ballistic computer should agree with the *E2* master counter.

Adjustment

If the counters do not agree, loosen A-73. Turn the spur gear below the clamp until the *E2* counter in the fuze ballistic computer agrees with the *E2* master counter.

Tighten A-73 and recheck.



A-74 R2 MASTER COUNTER to L-19

Location

A-74 is under cover 4, above and to the right of the *Tf* ballistic computer. L-19 is under cover 5, behind the R2 follow-up mounting plate. It is in a horizontal position with its lower limit toward the front.

Check

Turn the power OFF.

Turn the R2 follow-up output gearing to run R2 to the upper limit.

The R2 master counter should read 18,000 yards (180) on Mods 0 through 7, 9, 10, and 13.

On Mods 8 and 12, the upper limit of R2 is 20,000 yards (200).

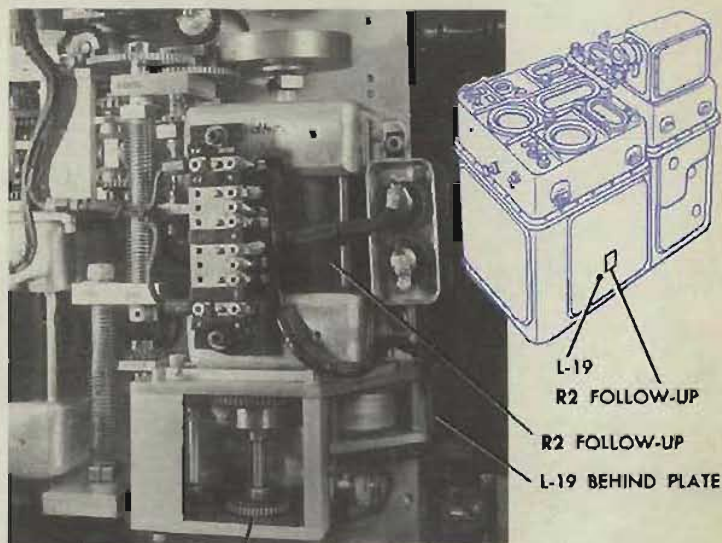
Turn the gearing to run R2 to the lower limit. The R2 master counter should read 500 yards (005) on Mods 3-7, 8, 10, 12, and 13.

On Mods 0, 1, 2, and 9, the lower limit is 1500 yards (015).

Adjustment

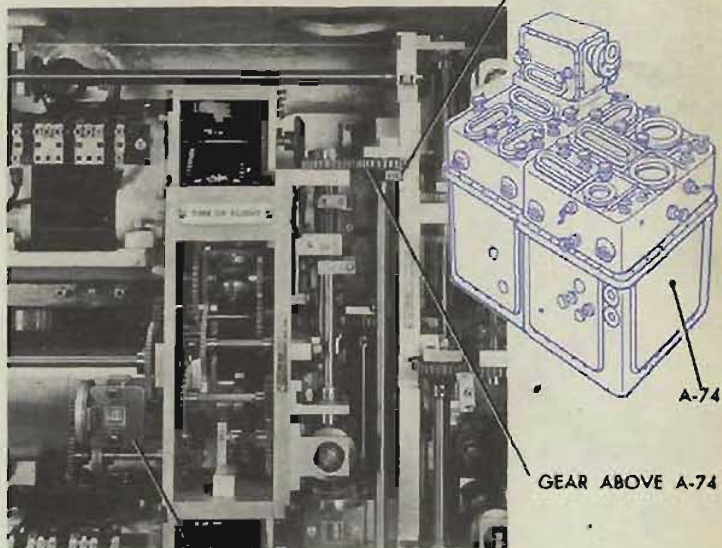
If the R2 master counter does not read correctly, loosen A-74. Hold the shaft below A-74 to keep the line against the stop. Turn the gear above A-74 until the R2 master counter reads correctly. Tighten A-74. Re-check the limits.

Readjust any clamps that were loosened. Check A-75, A-76, A-203, A-156, A-92, and A-104.



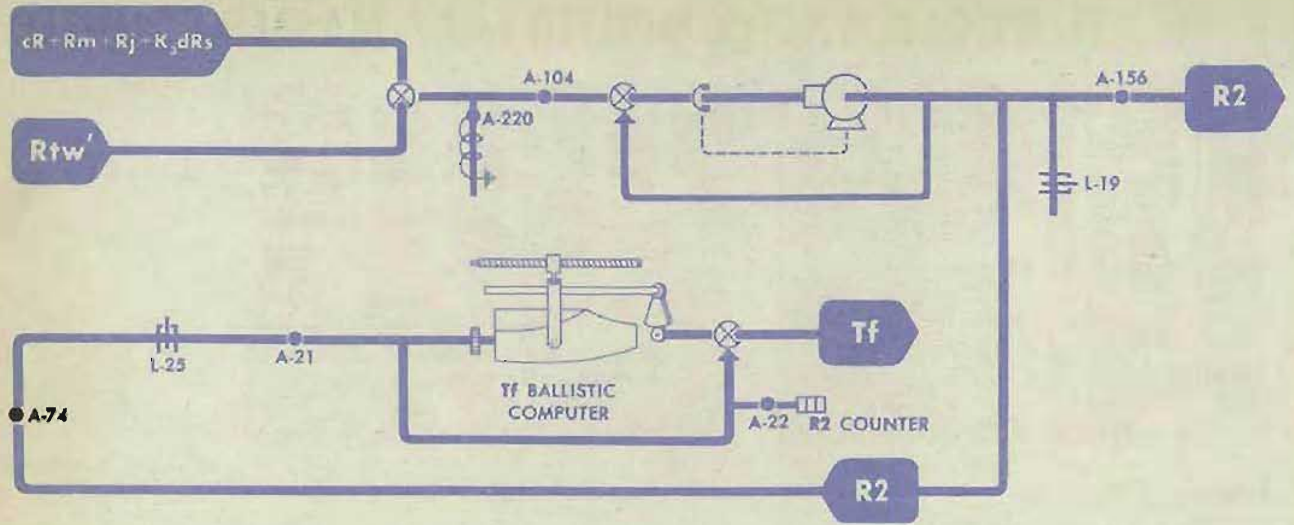
R2 FOLLOW-UP
OUTPUT GEARING

L-19
R2 FOLLOW-UP
R2 FOLLOW-UP
L-19 BEHIND PLATE

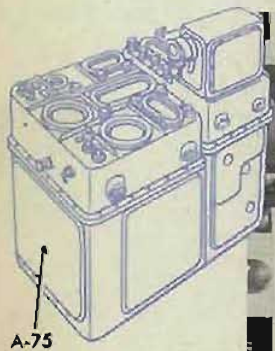


R2 COUNTER

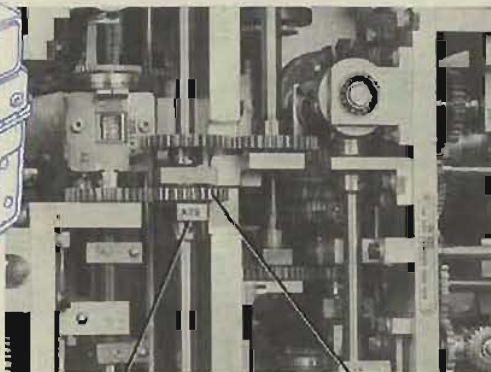
A-74
A-74
GEAR ABOVE A-74



A-75 Vf + Pe BALLISTIC COMPUTER to R2 MASTER COUNTER

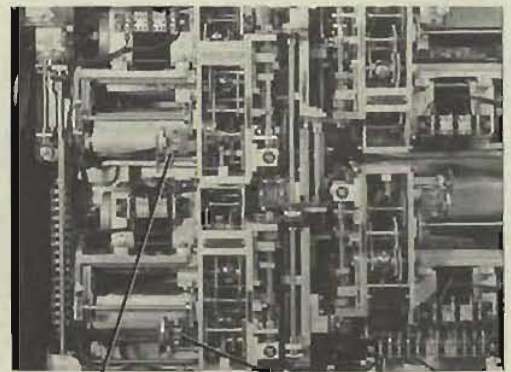


A-75



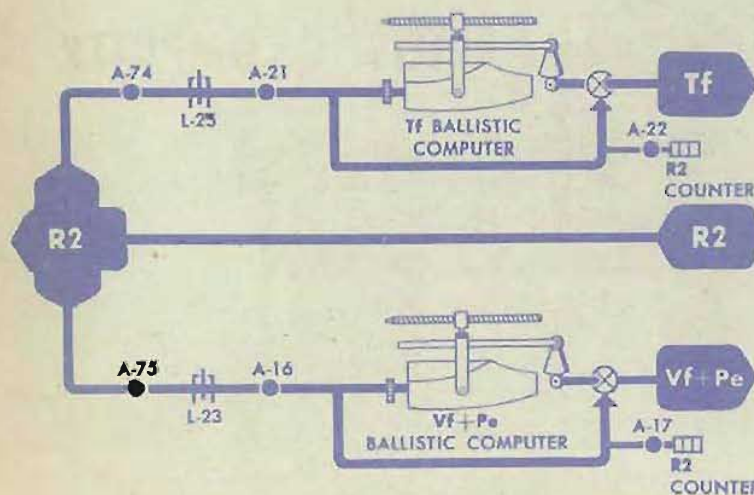
A-75

SPUR GEAR



R2 COUNTER IN Tf BALLISTIC COMPUTER

R2 COUNTER IN Vf + Pe BALLISTIC COMPUTER



Location

A-75 is under cover 4, to the right of the Vf + Pe ballistic computer.

Check

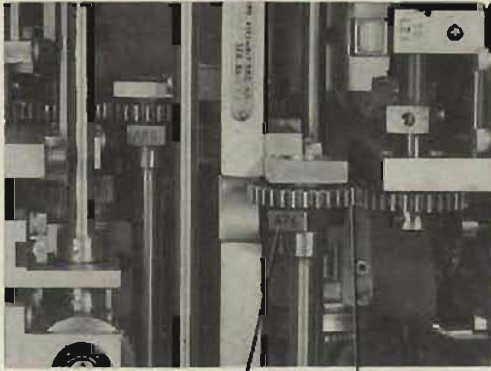
The R2 counters in the Tf and Vf + Pe computers should agree.

Adjustment

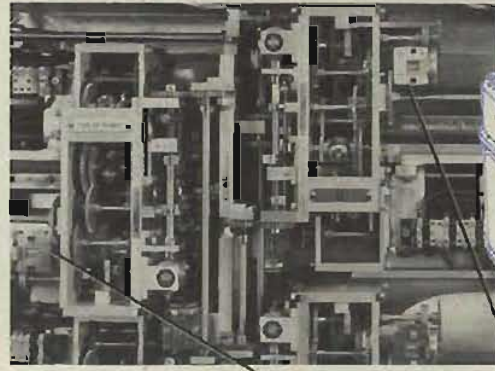
If the counters do not agree, make A-75 slip-tight. Turn the spur gear above the clamp until the counters agree.

Tighten A-75 and recheck.

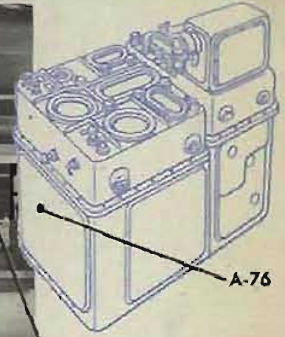
A-76 Tf/R2 BALLISTIC COMPUTER to R2 MASTER COUNTER



A-76 GEAR ABOVE CLAMP



R2 COUNTER IN Tf BALLISTIC COMPUTER R2 COUNTER IN Tf/R2 BALLISTIC COMPUTER



Location

A-76 is under cover 4, to the left of the Tf/R2 ballistic computer.

Check

On Ser. Nos. 810 and lower, the R2 counter in the Tf/R2 ballistic computer should agree with the R2 master counter in the Tf ballistic computer unless an offset has been purposely introduced per Bureau of Ordnance Information Bulletin 4-44.

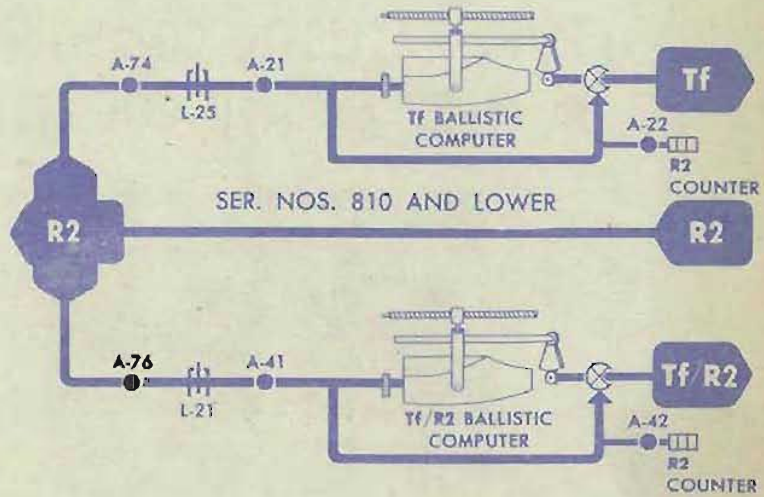
On Ser. Nos. 811 and higher, set front I.V. at 2550 f.s. Then the R2m counter in the Tf/R2 ballistic computer should agree with the R2 master counter.

Adjustment

If the counters do not agree, make A-76 slip-tight.

Turn the spur gear above the clamp until the counters agree.

Tighten A-76 and recheck.



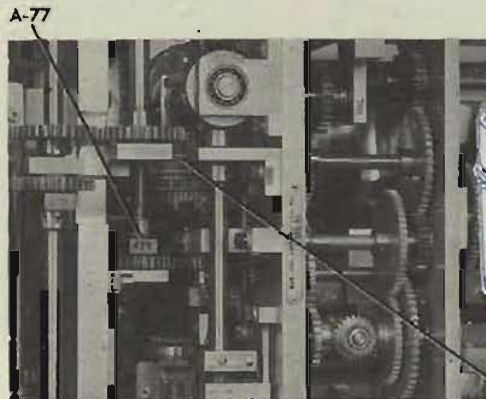
A-77 F INDICATING COUNTER to F BALLISTIC COMPUTER

Location

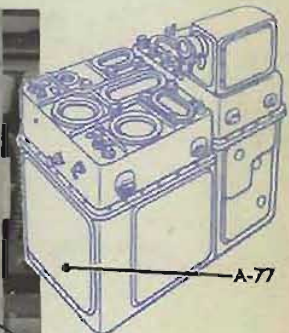
A-77 is under cover 4, on the left side of the fuze ballistic computer. The F counter is in the F ballistic computer. The F indicating counter is under cover 2.

Check

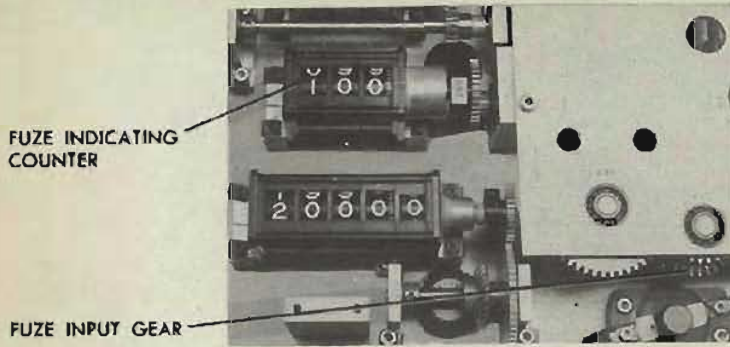
Both F counters should agree.



A-77



F COUNTER



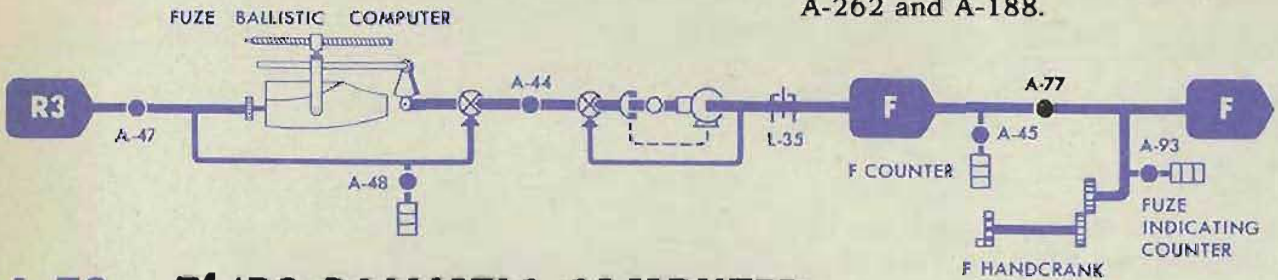
Adjustment

If the counters do not agree, check A-93. Make A-77 slip-tight.

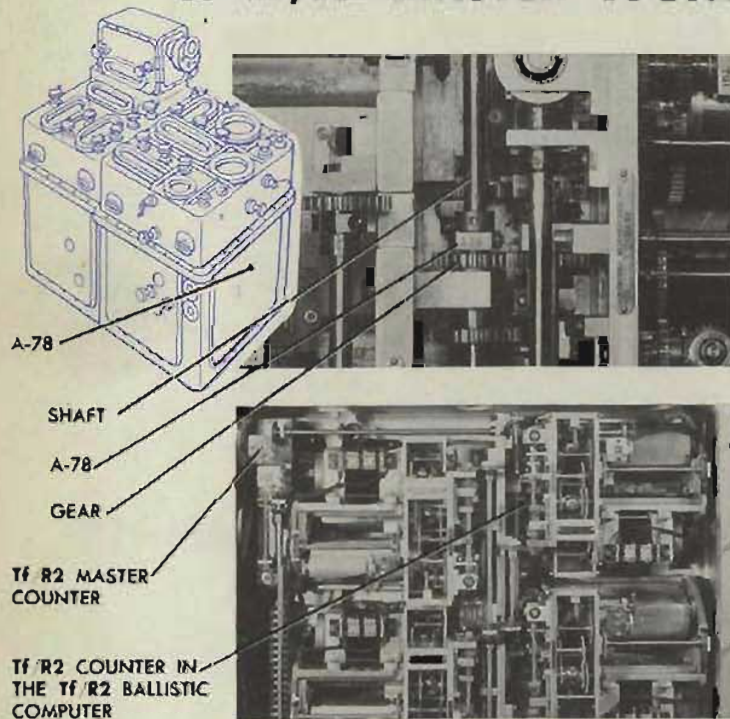
Use the *F* handcrank to bring the *F* indicating counter to the same reading as the fuze ballistic computer counter.

Tighten A-77 and recheck.

On Ser. Nos. 781 and higher, check A-262 and A-188.



A-78 Tf/R2 BALLISTIC COMPUTER to Tf/R2 MASTER COUNTER



Location

A-78 is under cover 4.
Both *Tf/R2* counters are under cover 4.

Check

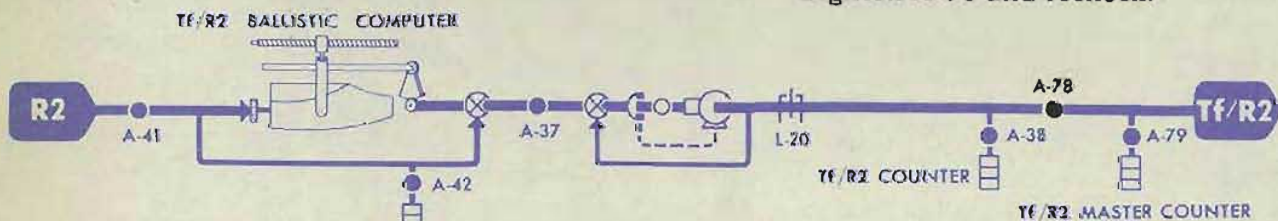
Both *Tf/R2* counters should agree.

Adjustment

If the counters do not agree, make A-78 slip-tight.

Hold the spur gear below A-78 and turn the shaft until the *Tf/R2* master counter matches the ballistic counter.

Tighten A-78 and recheck.



A-79 Tf/R2 MASTER COUNTER to ELEVATION PREDICTION MULTIPLIER

Location

A-79 is under cover 4, below the gear on the drum of the *Tf/R2* master counter.

IMPORTANT

Before this counter can be set at the check value, A-78 and A-133 must be loosened.

Check

Set the *Tf/R2* counter at 0.00115 by turning the shaft line to the counter. The lead screw of the elevation prediction multiplier should now be in a position where full travel of the *RdE - K₁WrE* input rack will cause no movement of the *Vtw'* output rack.

Turn the power ON.

Pull the *Vs* handcrank OUT.

Loosen A-134 and turn the spur gear next to the clamp to run the *RdE - K₁WrE* rack from limit to limit. Motion of the *V* follow-up output gearing indicates movement of the *Vtw'* output rack.

Adjustment

If the *V* follow-up output gearing moves, make A-79 slip-tight. Gently turn the shaft below A-79 until the multiplier lead screw is at its lower limit. Hold the shaft against the lower limit and slip the *Tf/R2* counter to 0.001095.

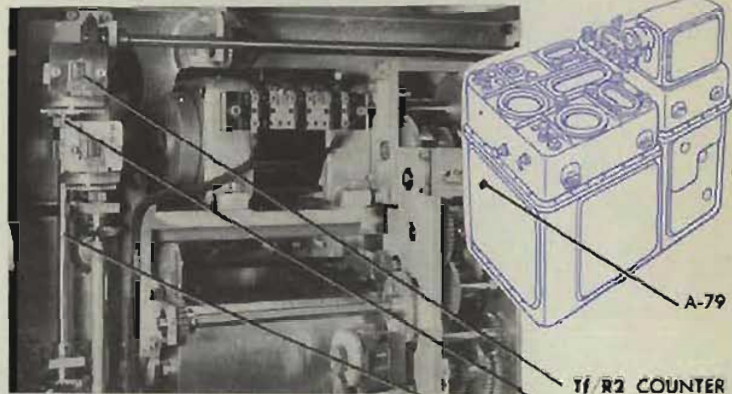
Turn the shaft until the *Tf/R2* counter again reads 0.00115.

Repeat the check.

If the adjustment is still off, correct slightly by turning the shaft below A-79 until the *Tf/R2* input screw is at its zero position. This is the position at which full travel of the *RdE - K₁WrE* input rack produces no movement of the *V* follow-up output gearing. Hold the *Tf/R2* input shaft and reset the counter at 0.00115.

Tighten A-79 and recheck.

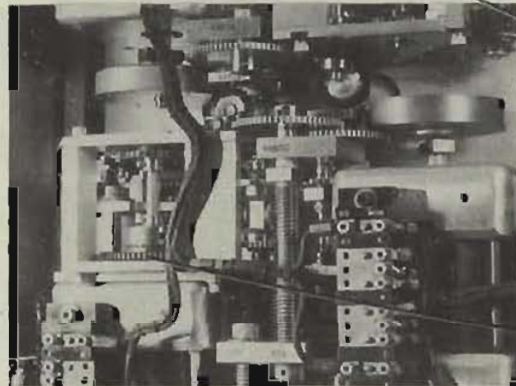
Readjust A-134, A-133, A-78.



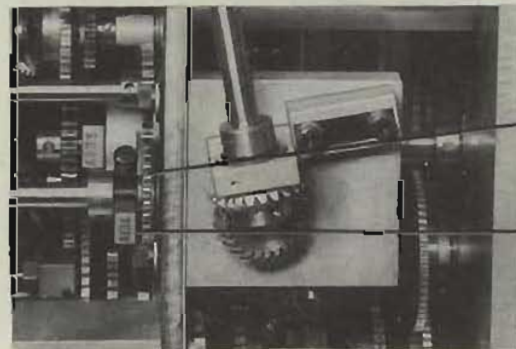
Tf/R2 COUNTER

A-79

SHAFT

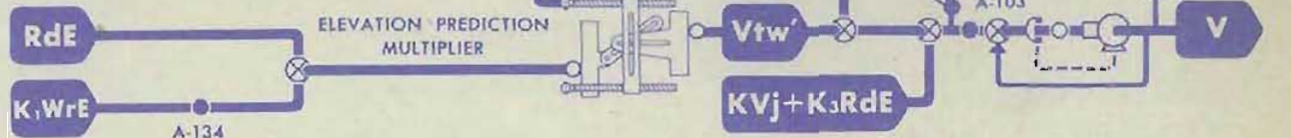


V FOLLOW-UP OUTPUT GEARING

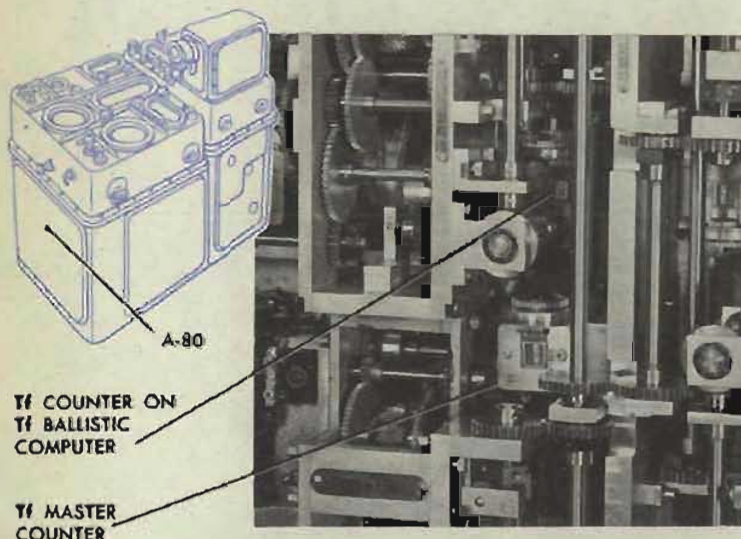


SPUR GEAR

A-134



A-80 Tf BALLISTIC COMPUTER to Tf MASTER COUNTER

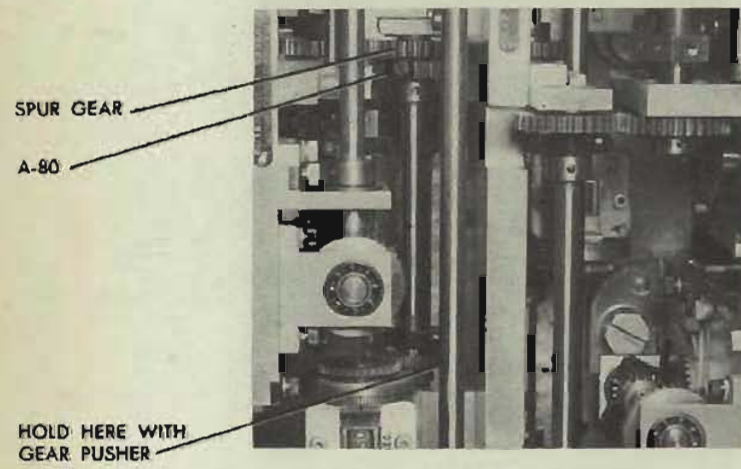


Location

A-80 is under cover 4, to the right of the Tf ballistic computer.

Check

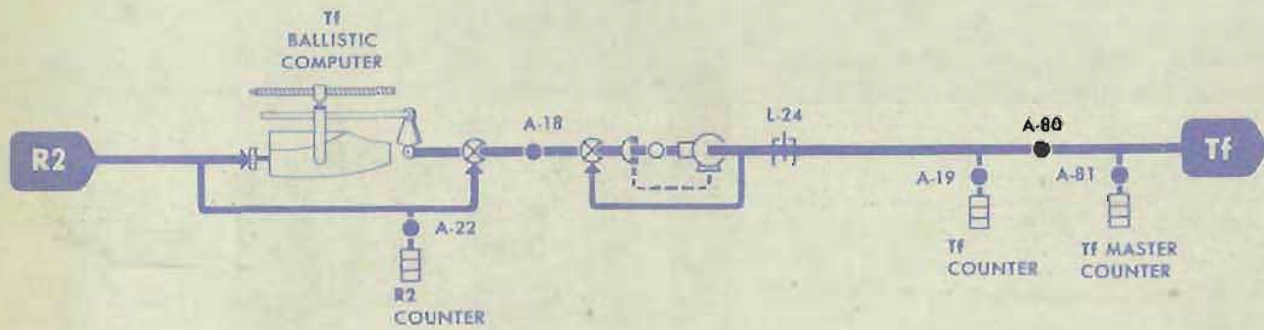
The Tf master counter and the Tf ballistic counter should agree.



Adjustment

If the counters do not agree, make A-80 slip-tight. Turn the spur gear above the clamp until the Tf counter in the ballistic computer agrees with the Tf master counter.

Tighten A-80 and recheck.



A-81 T_f MASTER COUNTER to RANGE PREDICTION MULTIPLIER

Location

A-81 is under cover 4, at the lower right of the *T_f* ballistic computer, above the *T_f* counter.

Check

Remove leads A and AA from the *T_f* follow-up.

Turn the power ON.

Set the *T_f* counter at 5 seconds (050) by turning the shaft line leading to the counter. On Mods 8 and 12, set *T_f* at 8 seconds (080).

Wedge the line.

The lead screw input of the range prediction multiplier should now be positioned so that movement of the $K (dR_s + K_1 W_r R)$ input rack causes no movement of the *R_{tw}'* output rack. To move the input rack, A-135 must be loosened and readjusted later.

The *R₂* follow-up gearing indicates *R_{tw}'* output.

Make indicating marks on the *R₂* follow-up output gearing.

Turn the small gear behind A-135 to move the input rack from limit to limit.

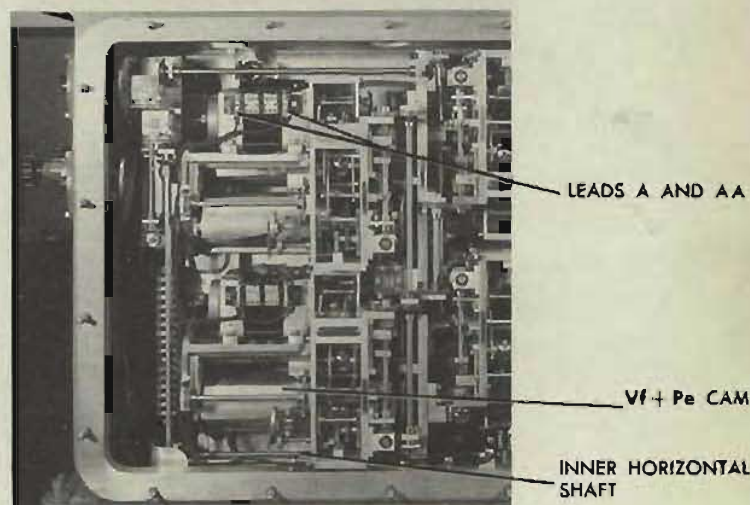
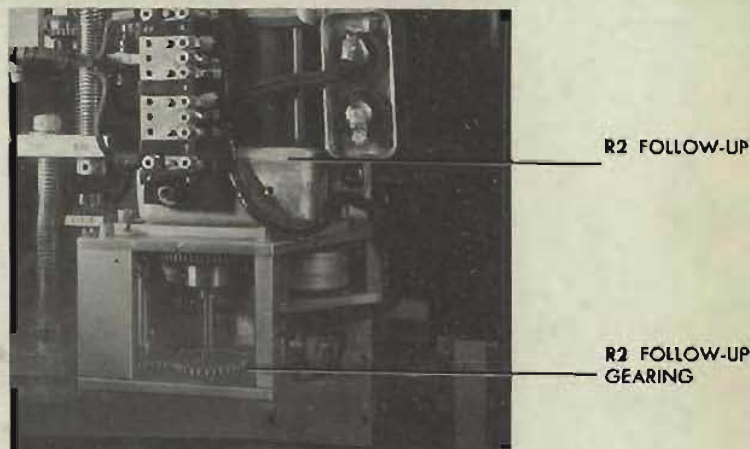
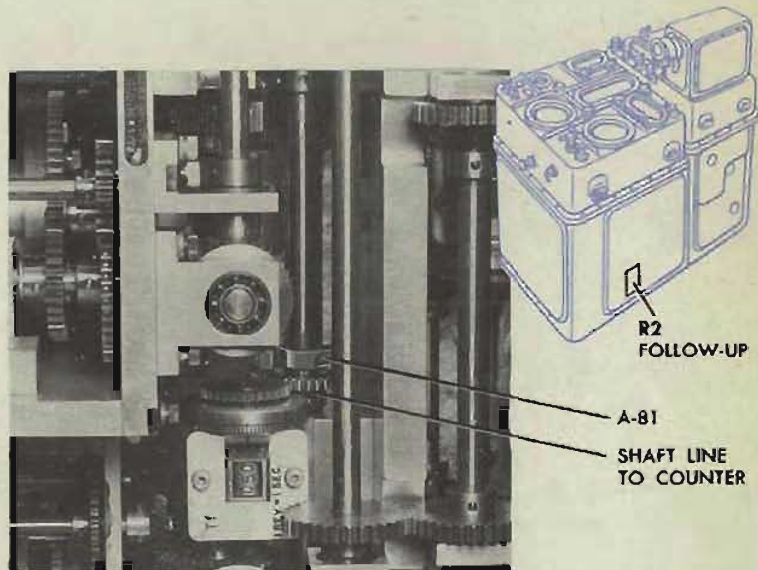
The indicating marks should remain matched.

Adjustment

If there is motion of the *R₂* follow-up output gearing, the lead screw input can be set approximately as follows:

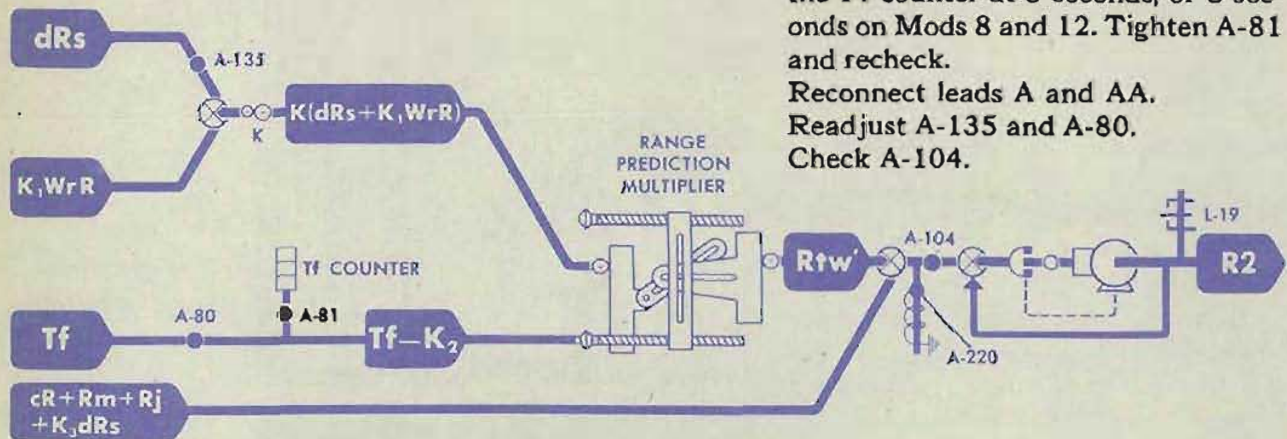
Loosen A-80.

Remove the wedge. Use the inner horizontal shaft below the *V_f* + *P_e* ballistic cam to turn *T_f* gently in a decreasing direction until the lead screw reaches its lower limit. Set the *T_f* counter at 99.05. On Mods 8 and 12, set *T_f* at 99.21. Make A-81 slip-tight. Turn the shaft to turn the lead screw in an increasing direction until the *T_f* counter reads 5 seconds (050), or 8 seconds (080) on Mods 8 and 12.

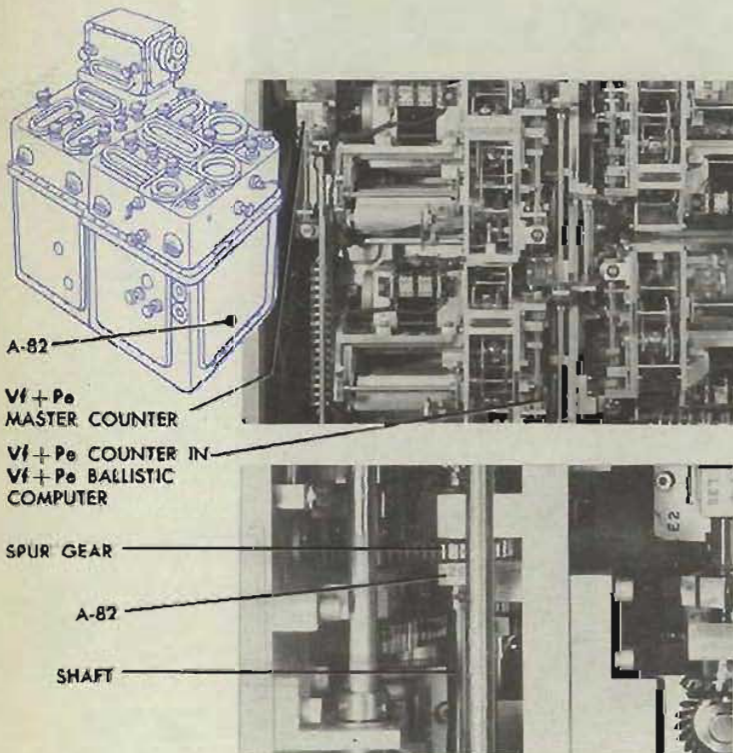


To refine the adjustment, move the input rack from limit to limit by turning the gear behind A-135. Note any output on the R2 follow-up output gearing. Turn the Tf gearing to correct for *one half* this output. When the multiplier lead screw is at the zero position where full travel of the input rack produces no output, hold the shaft going to the lead screw and reset the Tf counter at 5 seconds, or 8 seconds on Mods 8 and 12. Tighten A-81 and recheck.

Reconnect leads A and AA. Readjust A-135 and A-80. Check A-104.



A-82 Vf + Pe BALLISTIC COMPUTER to Vf + Pe MASTER COUNTER



A-82
Vf + Pe MASTER COUNTER
Vf + Pe COUNTER IN Vf + Pe BALLISTIC COMPUTER

SPUR GEAR
A-82
SHAFT

Location

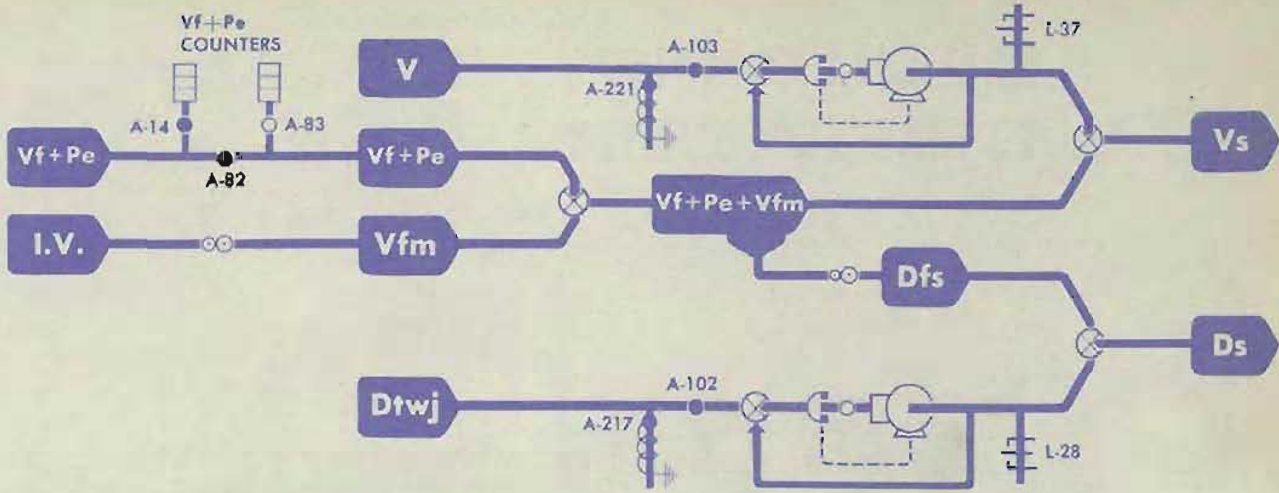
A-82 is under cover 4, to the right of the Vf + Pe ballistic computer. Both Vf + Pe counters are under cover 4.

Check

The Vf + Pe counters should agree.

Adjustment

If the counters do not agree, make A-82 slip-tight. Hold the spur gear above the clamp and match the Vf + Pe master counter to the Vf + Pe ballistic computer by turning the shaft below A-82. Tighten A-82 and recheck. Check A-83, A-102, and A-103.



A-83 ASSEMBLY CLAMP

Location

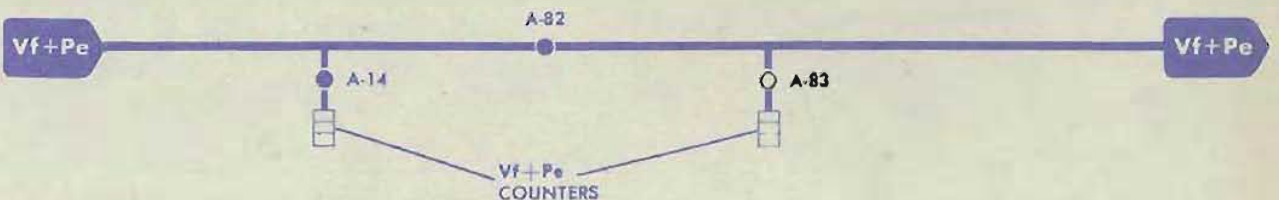
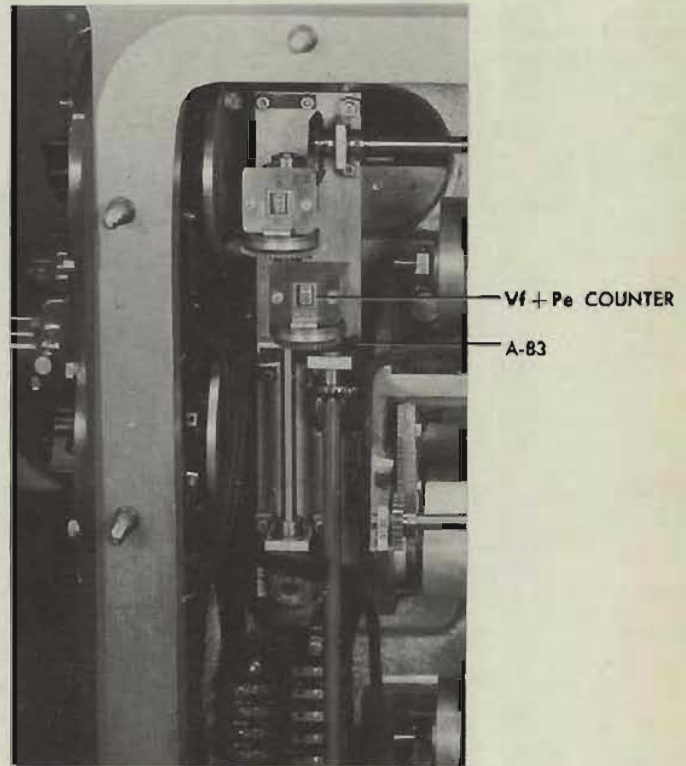
A-83 is under cover 4, below the $Vf + Pe$ counter.

Check

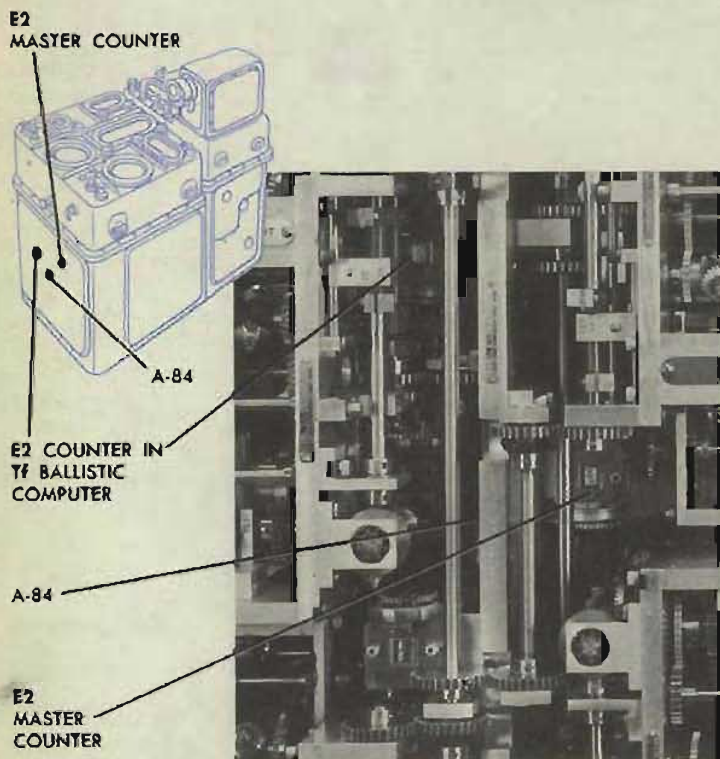
A-83 should be tight.

Adjustment

If A-83 is loose, tighten it.
Check A-82.



A-84 Tf BALLISTIC COMPUTER to E2 MASTER COUNTER



Location

A-84 is under cover 4, to the right of the Tf ballistic computer.

The Tf ballistic computer E2 counter is located to the right of the Tf ballistic cam.

The E2 master counter is under cover 4, in the center of the ballistic section above A-72.

Check

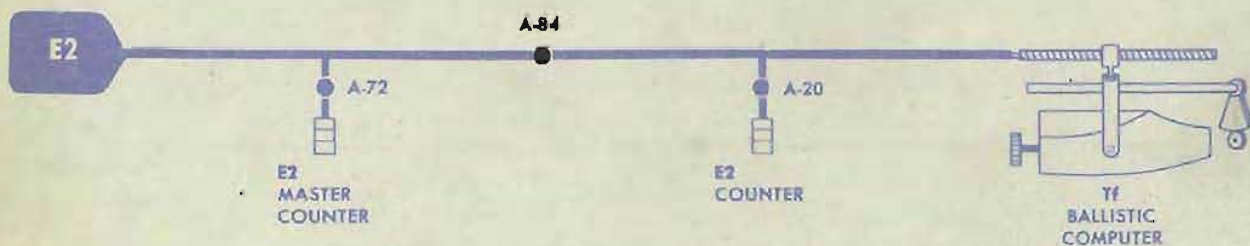
Both E2 counters should agree.

Adjustment

If the counters do not agree, turn the power OFF. Make A-84 slip-tight.

Use a gear pusher to turn the spur gear above clamp A-84 until the E2 counter in the Tf ballistic computer agrees with the E2 master counter.

Tighten A-84 and recheck.



A-85 Vf + Pe BALLISTIC COMPUTER to E2 MASTER COUNTER

Location

A-85 is under cover 4, to the right of the Vf + Pe computer.

The Vf + Pe ballistic computer E2 counter is above A-85.

The E2 master counter is under cover 4, in the center of the ballistic section above A-72.

Check

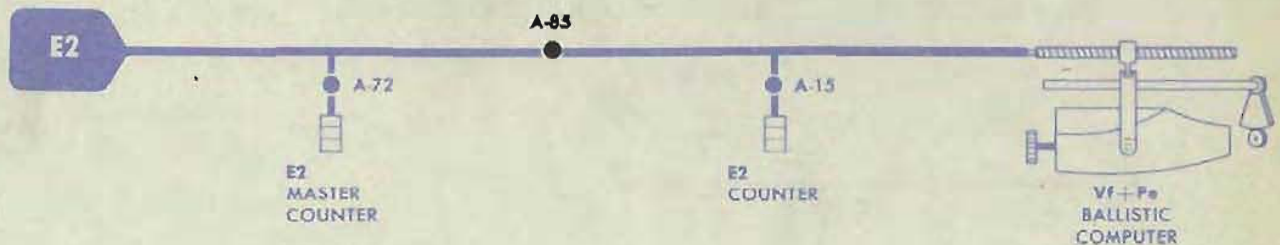
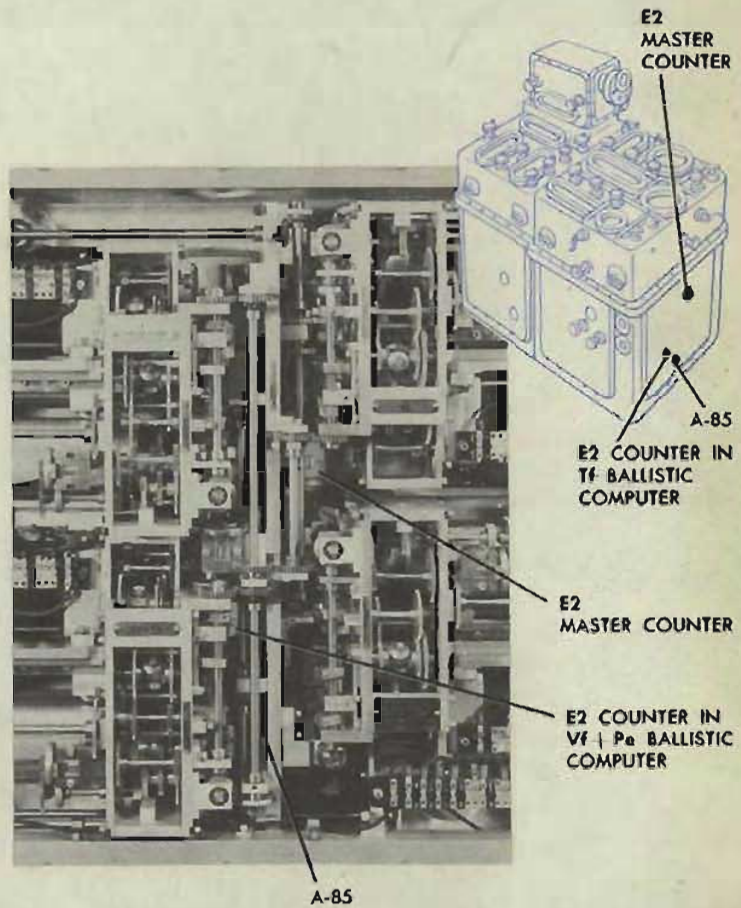
The E2 counters should agree.

Adjustment

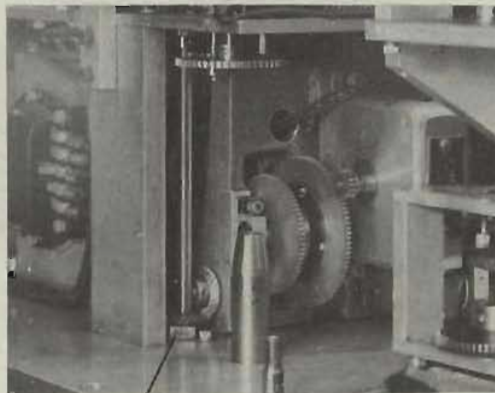
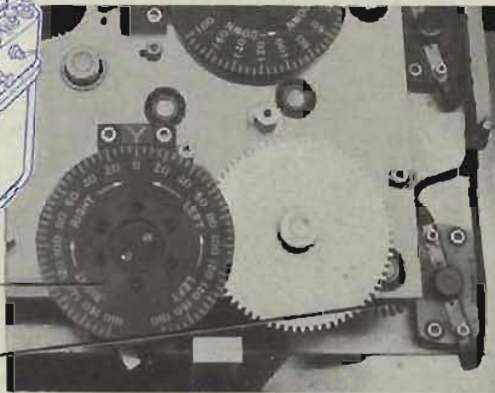
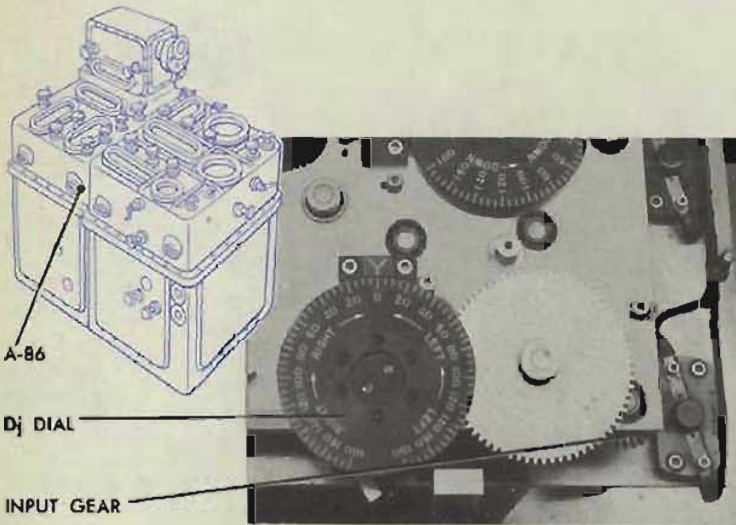
If the counters do not agree, make A-85 slip-tight.

Turn the spur gear above the clamp, until the counters agree.

Tighten A-85 and recheck.



A-86 Dj DIAL to Dj RECEIVER



A-86

Location

A-86 is under cover 2.

Check

Turn the power ON.

Pull the *Dj* knob OUT.

From the director, transmit 0 deflection spot.

The *Dj* follow-up will synchronize at its central position.

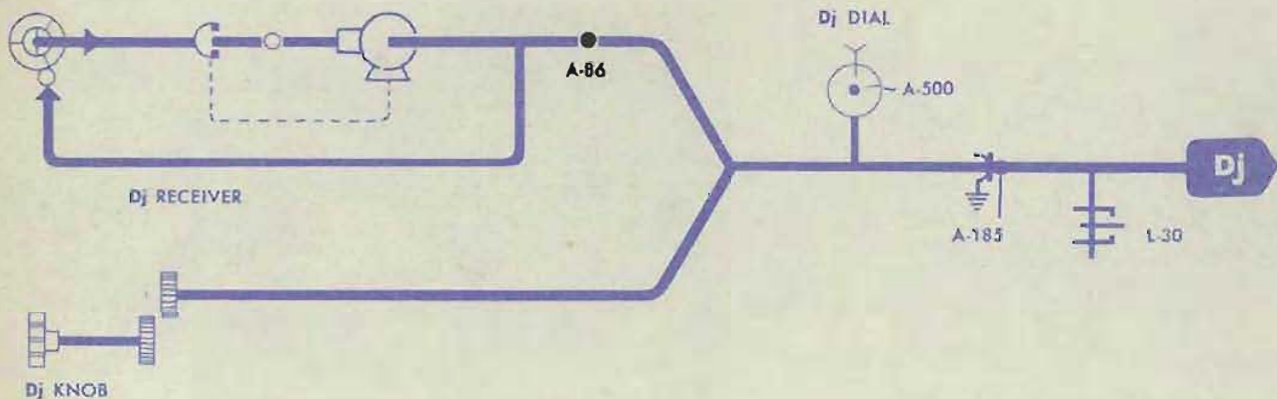
The *Dj* dial should read 0 mils.

Adjustment

If the *Dj* dial does not read 0, make A-86 slip-tight. Bring the *Dj* dial to 0 by turning the *Dj* input gear.

Tighten A-86, and recheck.

Check A-500.



A-87 Vj DIAL to Vj RECEIVER

Location

A-87 is under cover 2, near the main plate of the rear top section. It can be reached only from the rear.

Check

Turn the power ON.

Pull the *Vj* knob OUT.

From the director, transmit 0 elevation spot.

The *Vj* dial should read 0 mils.

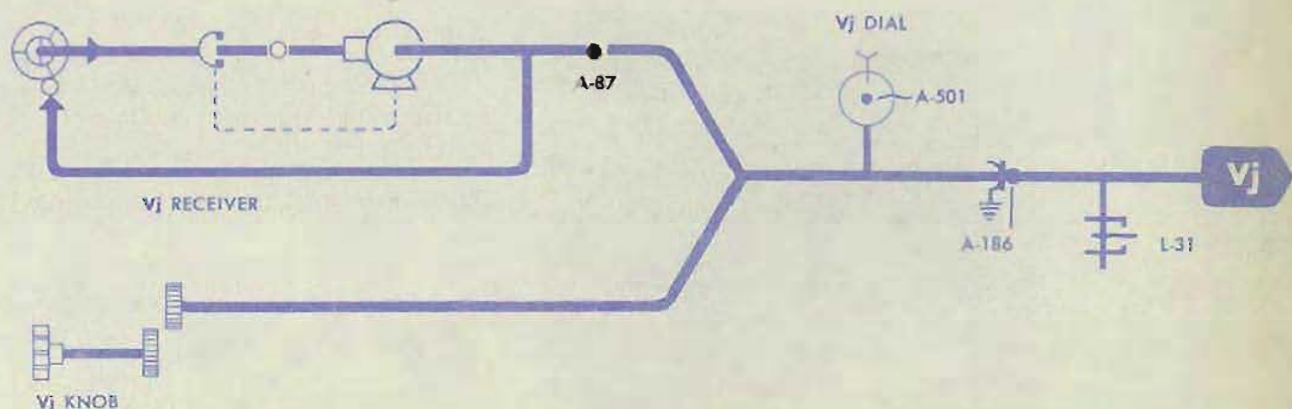
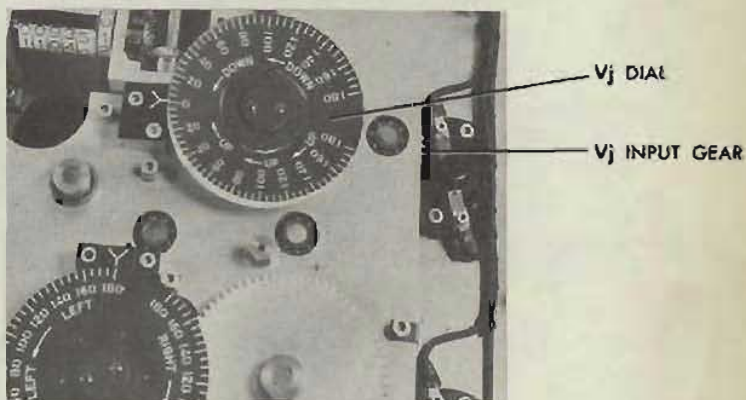
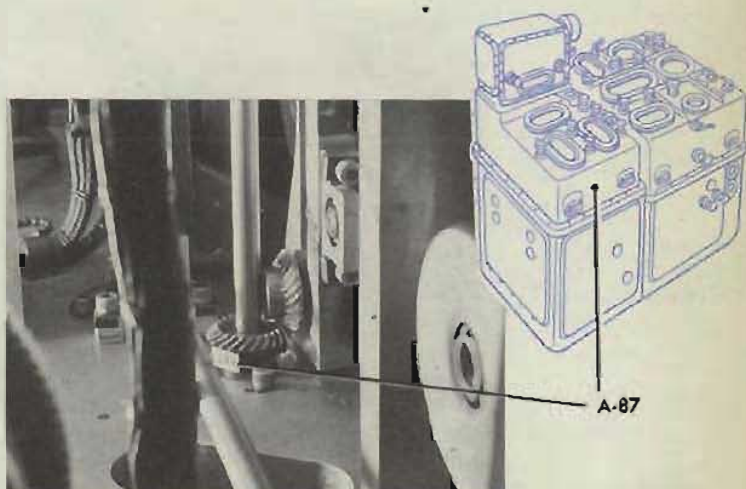
Adjustment

If the *Vj* dial does not read 0 mils, loosen A-87.

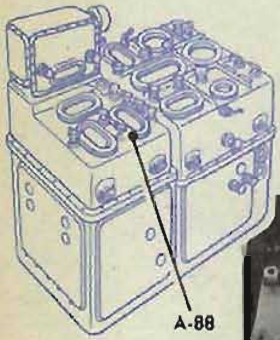
Bring the dial to 0 mils by turning the *Vj* input gear.

Tighten A-87 and recheck.

Check A-501.



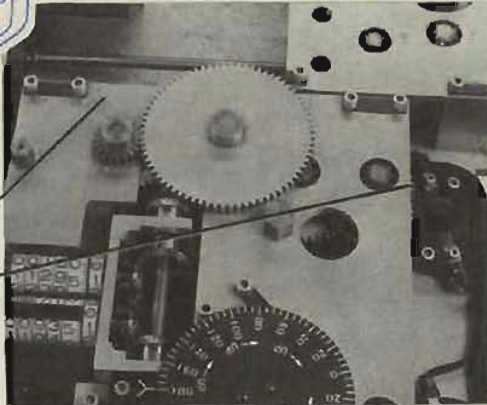
A-88 Rj COUNTERS to Rj RECEIVER



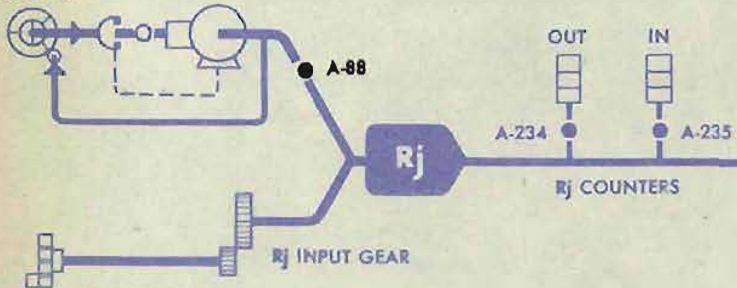
A-88

A-88 (BELOW PLATE)

Rj INPUT GEAR



Rj RECEIVER



Location

A-88 is under cover 2, under the mounting plate to the right of the Rj counter, near the deck plate. It is reached from the left side of the instrument.

Check

Turn the power ON.

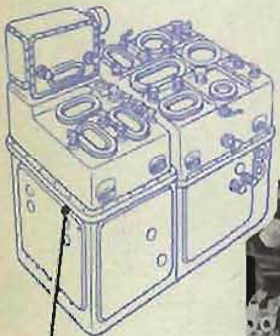
Pull the Rj handcrank OUT. Transmit Rj from the director. The computer Rj counters should agree with the director Rj dials.

Adjustment

If the Rj counters do not agree with the director Rj dials, make A-88 slip-tight. Make the counters agree with the director dials by turning the Rj input gear.

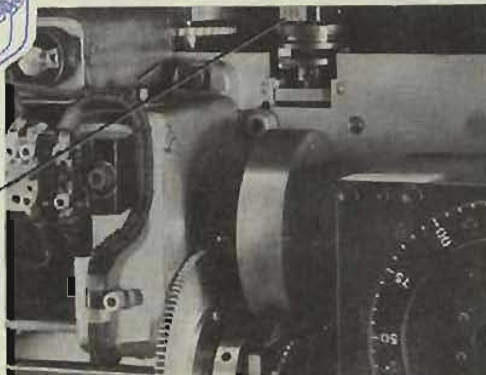
Tighten A-88 and recheck. Check A-234, A-235.

A-89 Ds INDICATING to Ds MASTER COUNTER



A-89

A-89



Location

A-89 is under cover 7.

The Ds indicating counter is at the top of the indicating unit, next to the Ds handcrank.

The Ds master counter is under cover 8.

Check

Both Ds counters should agree.

Adjustment

If the *Ds* counters do not agree, make A-89 slip-tight.

Turn the power OFF.

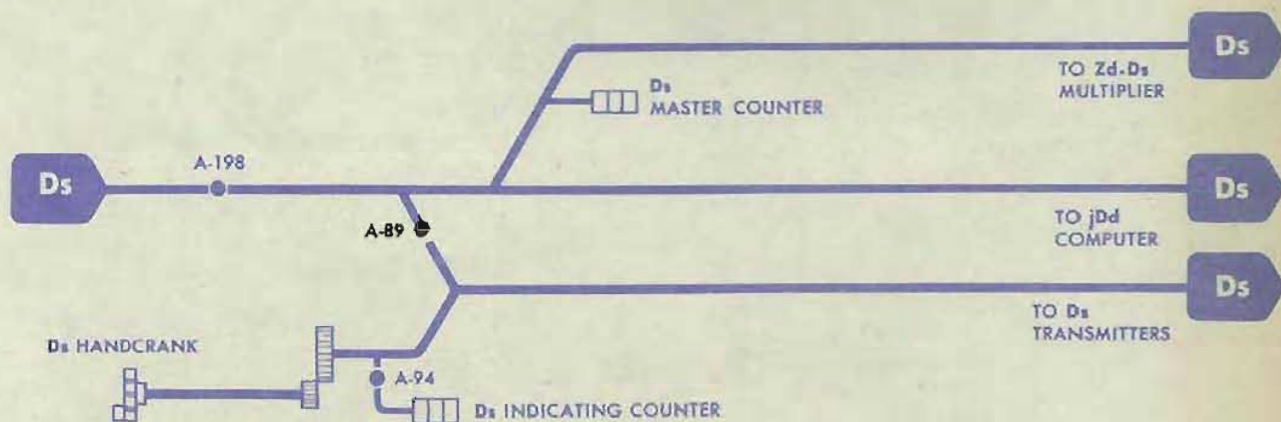
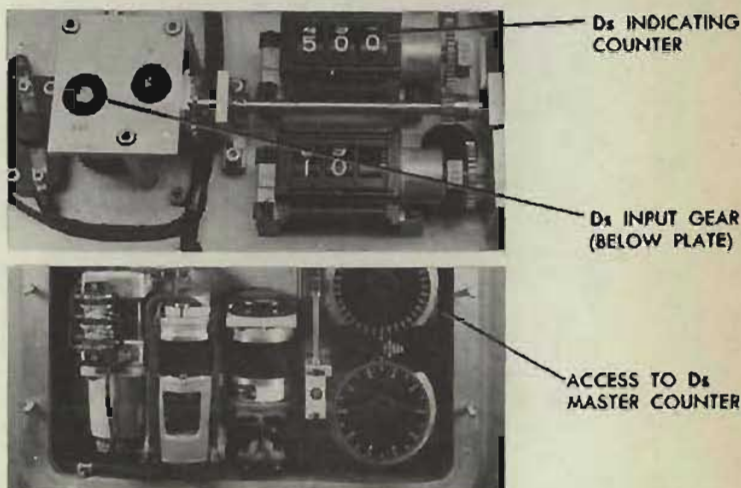
Wedge the output gearing of the *Dtwj* and *Vi + Pe* follow-ups.

Bring the *Ds* indicating counter to the same reading as the *Ds* master counter by turning the *Ds* input gear.

Tighten A-89 and recheck.

Remove the wedges from the *Dtwj* and *Vi + Pe* follow-up output gearing.

Check A-198 and A-94.



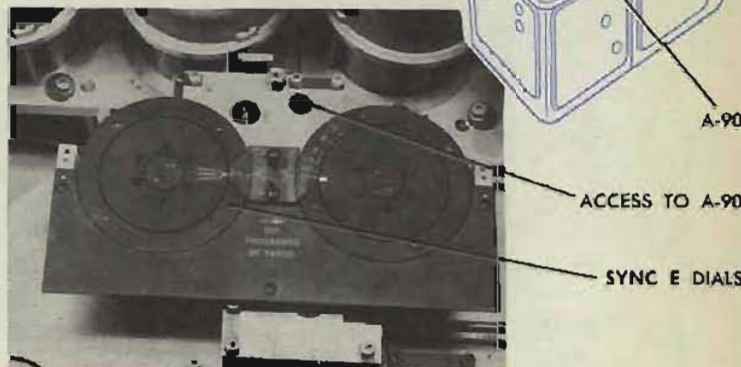
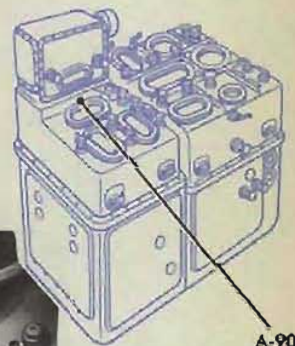
A-90 SYNC E DIALS to L-11

Location

A-90 is under cover 2, below the right half of the sync *E* dial mask. It can be reached through the small access hole, after the dial mask is removed.

L-11 is under cover 6, near the deck tilt multipliers.

The shaft is horizontal, and the lower limit is toward the left.



Check

Lower limit

Set *L* at 800°.

Set *E* at -5° with the sync *E* handcrank in the CENTER position. Then turn the handcrank counterclockwise in the OUT position until the limit of *L*-11 is reached.

The sync *E* dials should be matched at the fixed index.

Upper limit

Set *L* at 3500°.

Set *E* at 85° with the sync *E* handcrank in the CENTER position. Then turn the handcrank clockwise in the OUT position until the limit of *L*-11 is reached. The sync *E* dials should be matched at the fixed index.

NOTE:

There may be a slight overtravel at each limit.

Adjustment

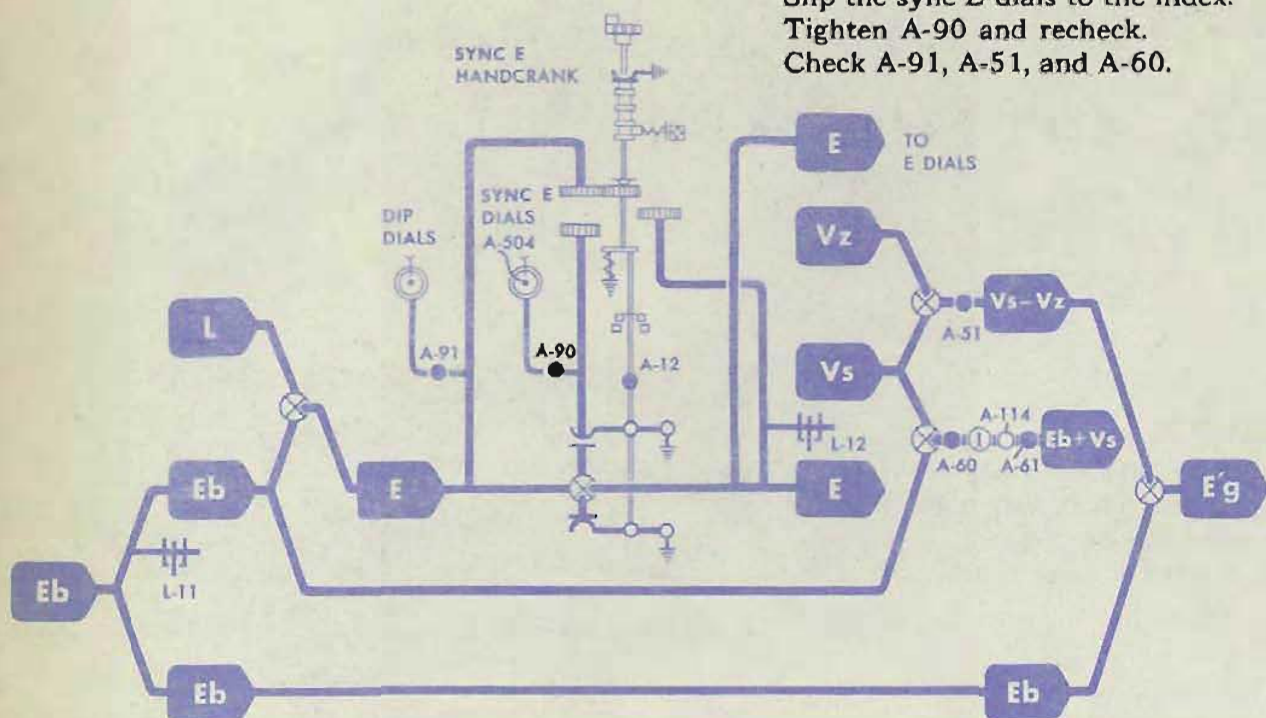
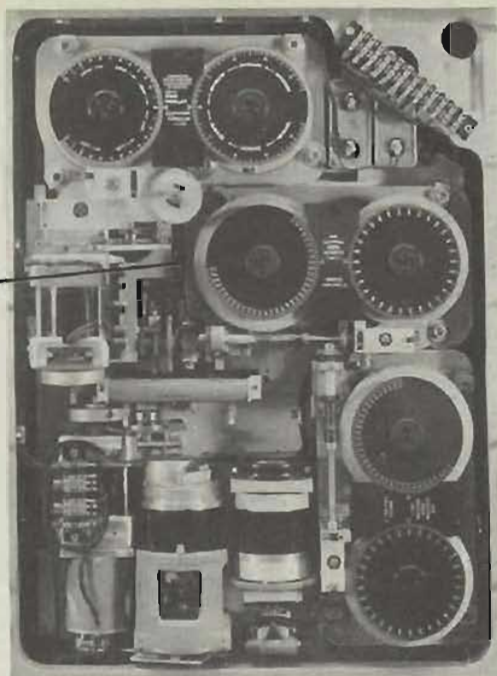
If the sync *E* dials do not match at the fixed index, at either limit of *L*-11, loosen *A*-90.

Slip the sync *E* dials to the index.

Tighten *A*-90 and recheck.

Check *A*-91, *A*-51, and *A*-60.

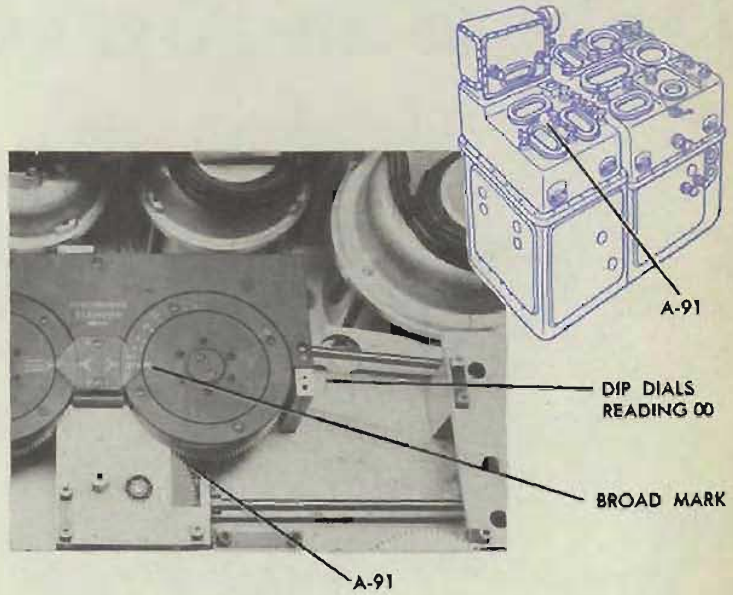
L-11
(BEHIND PLATE)



A-91 DIP DIALS to SYNC E LINE

Location

A-91 is under cover 2, below the left half of the sync E dial mask.



Check

Set *L* at 2000' on the computer *L* dials.

Set *E* at 0°, with the sync *E* handcrank at CENTER.

Match the sync *E* dials at the fixed index, with the sync *E* handcrank OUT.

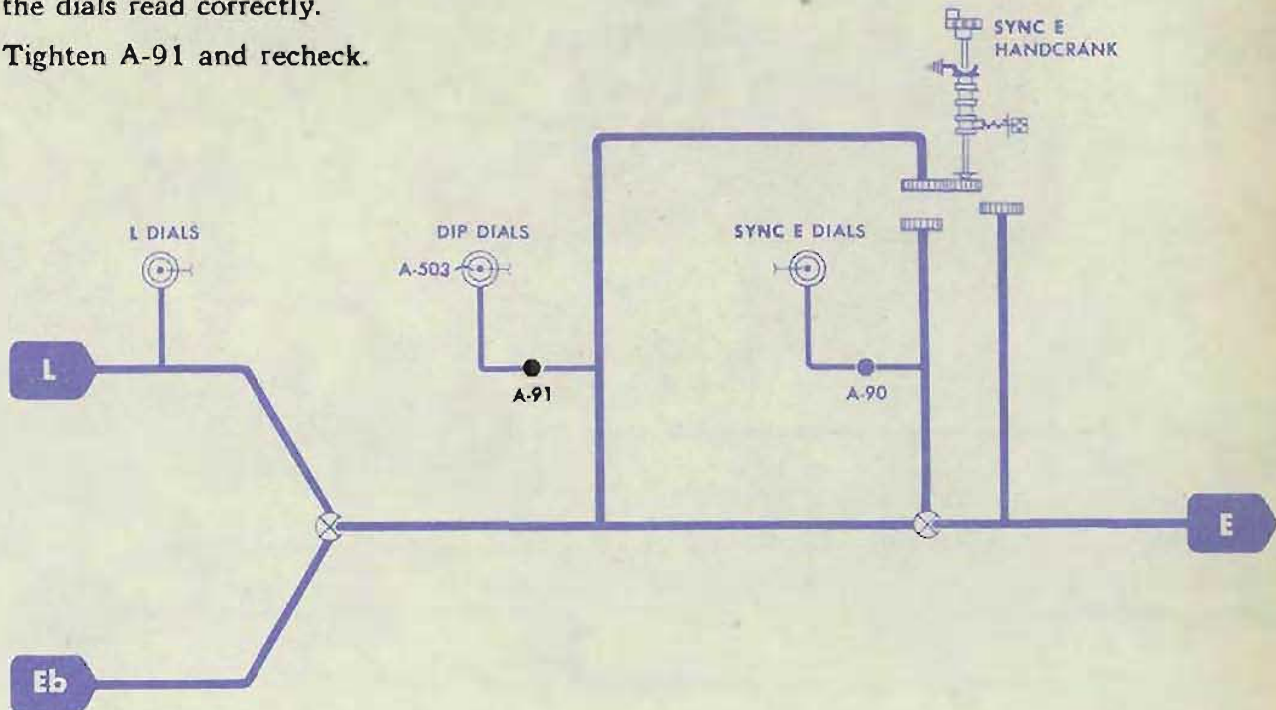
The dip dials should now be positioned with the infinity mark and the counterclockwise edge of the broad index mark at the fixed index.

Adjustment

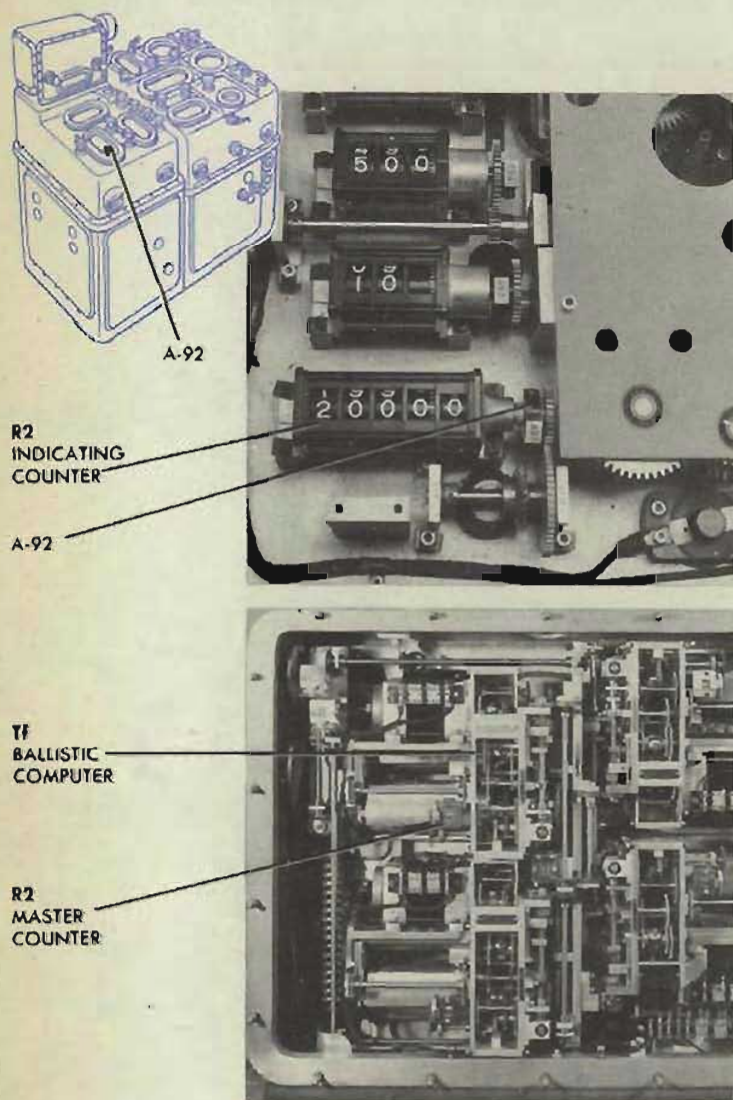
If the dip dials are not correctly positioned, slip-tighten A-91.

Use a gear pusher to turn the vertical bevel gear at the rear of A-91 until the dials read correctly.

Tighten A-91 and recheck.



A-92 R2 INDICATING to R2 MASTER COUNTER



Location

A-92 is on the R2 indicating counter shaft. The R2 master counter is under cover 4, in the Tf ballistic computer.

Check

The R2 counter readings should agree.

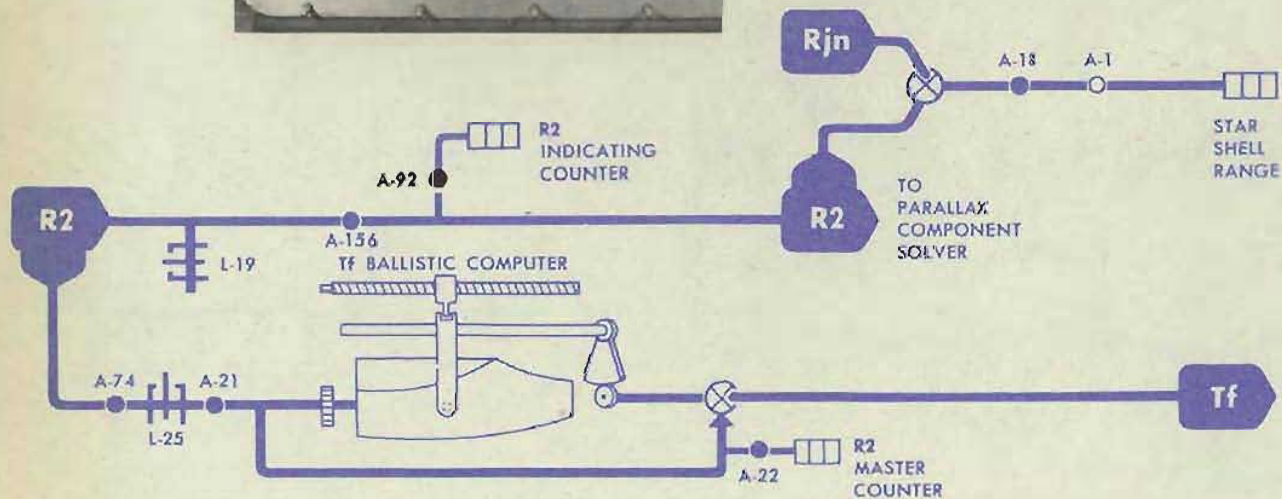
Adjustment

If the R2 indicating counter does not agree with the R2 master counter, loosen A-92.

Turn the R2 indicating counter until it agrees with the R2 counter in the ballistic section.

Tighten A-92 and recheck.

Check A-18 in the star shell computer.



A-93 F INDICATING COUNTER to F TRANSMITTER

Location

A-93 is under cover 2 on the *F* counter shaft.

Check

Set the *F* counter at 10 seconds. Use the *F* input gear.

The *F* transmitter should be on electrical zero.

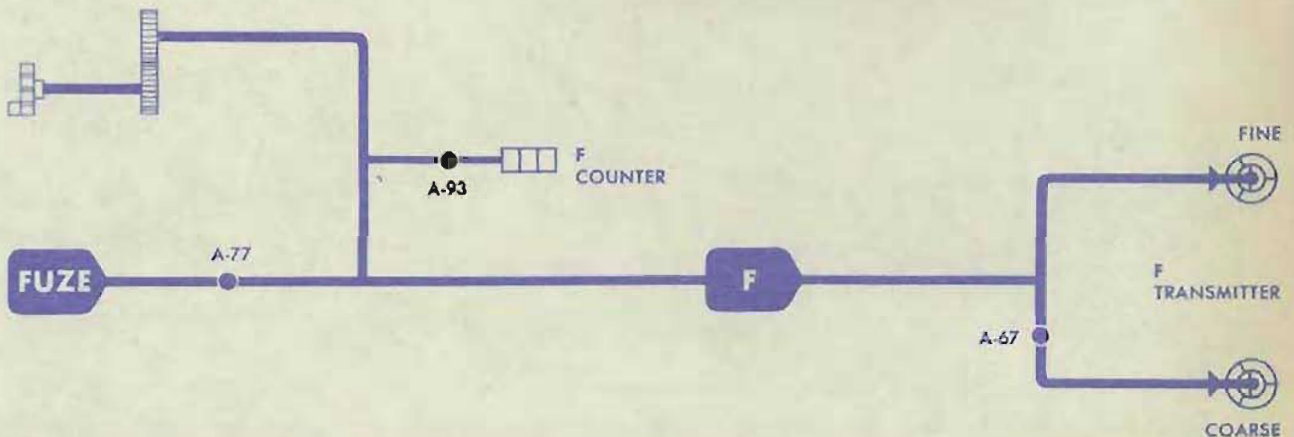
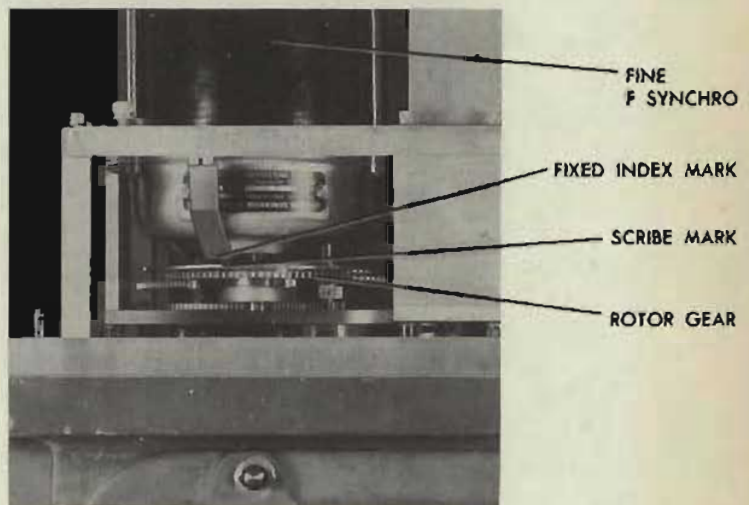
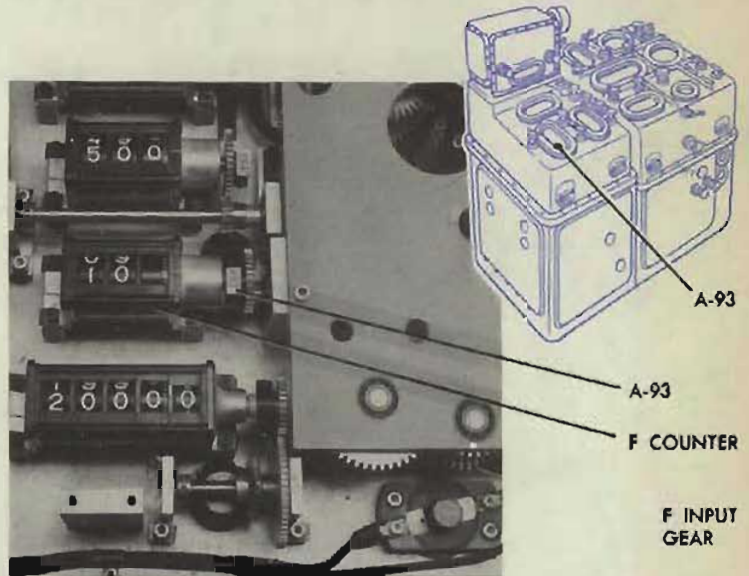
Both synchros are on electrical zero when the scribe marks on the rotor gears match the fixed indexes.

Adjustment

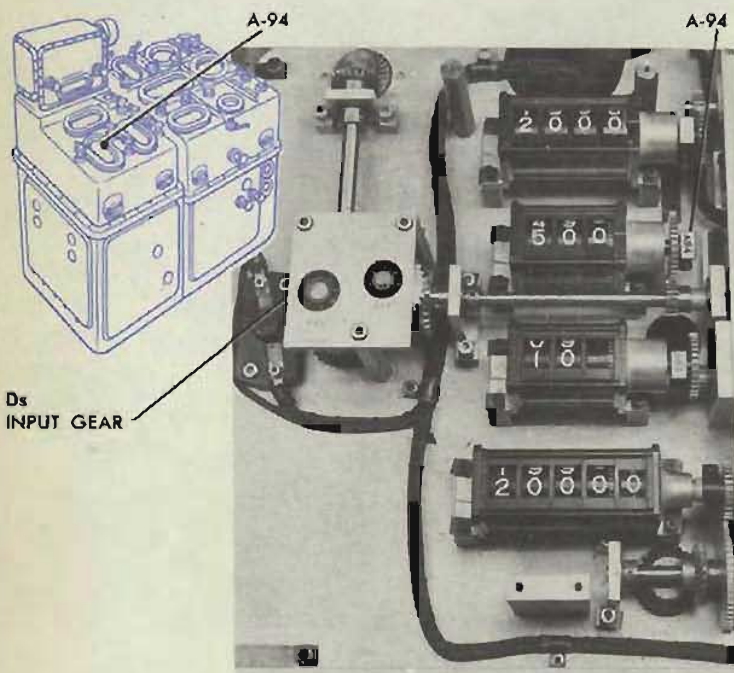
If the transmitter is not on electrical zero, make A-93 slip-tight.

Hold the *F* counter at 10 seconds. Turn the *F* input gear until the transmitter is on electrical zero.

Tighten A-93 and recheck. Readjust A-77 and check A-67.



A-94 Ds INDICATING COUNTER to Ds DOUBLE-SPEED TRANSMITTER



Location

A-94 is under cover 2, on the Ds indicating counter shaft.

Check

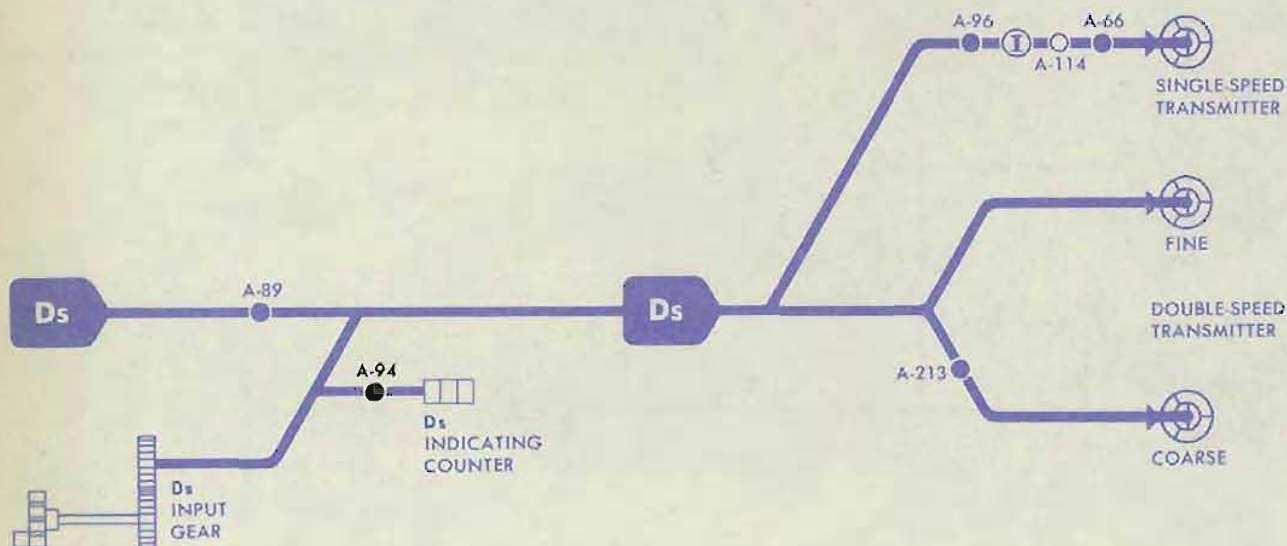
On Mods 0, 2, and 6, A-94 is an assembly clamp. Check that it is tight.

On other mods, proceed as follows: Set the Ds counter at 500 mils. The Ds double-speed transmitter should be on electrical zero. Both synchros are on electrical zero when the scribe marks on the rotors match the fixed indexes.

Adjustment

If both synchros are not on electrical zero, make A-94 slip-tight. Hold the counter at 500 mils and bring the synchros to electrical zero by turning the Ds input gear.

Tighten A-94 and recheck. Readjust A-89 and check A-96.



A-95 V_s INDICATING COUNTER to V_s DOUBLE-SPEED TRANSMITTER

Location

A-95 is under cover 2, on the V_s counter shaft.

Check

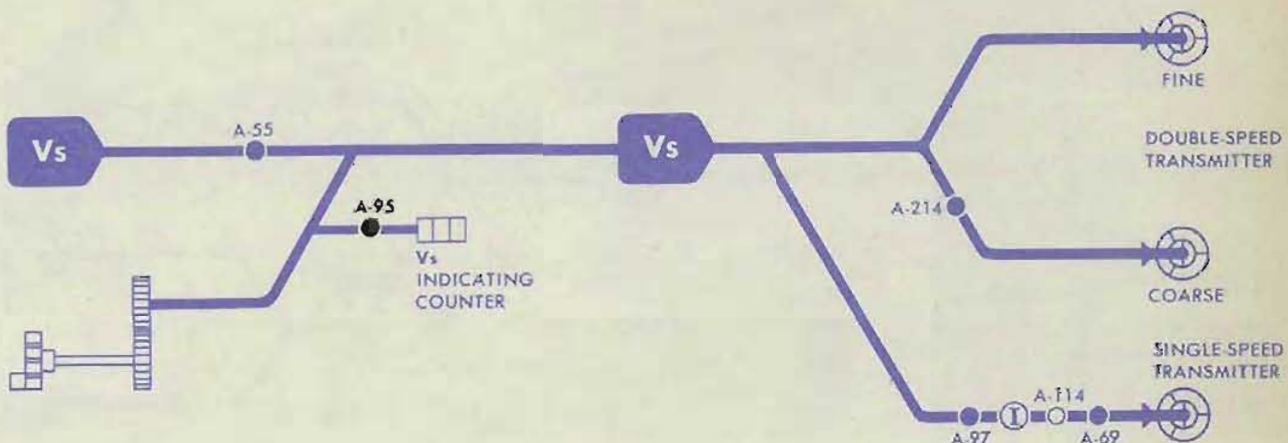
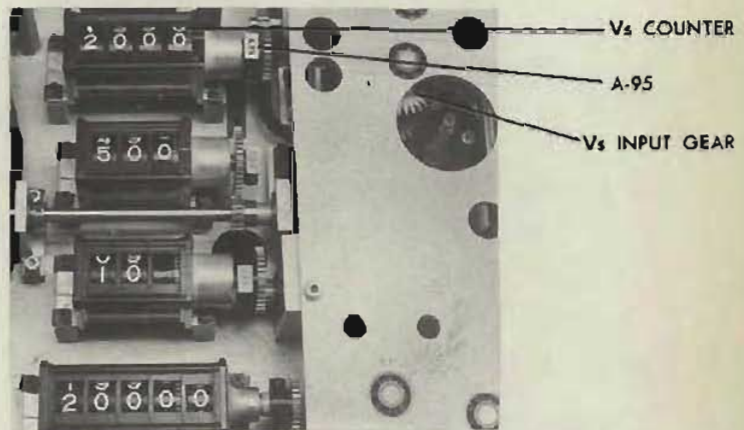
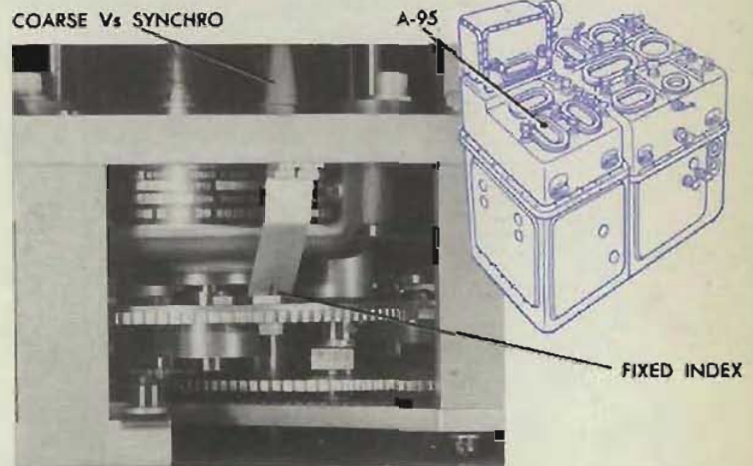
On Mods 0, 2, and 6, A-95 is an assembly clamp. Check that it is tight.

On other mods, proceed as follows: Set the V_s counter at 2000'. Use the V_s input gear. The V_s double-speed transmitter should now be on electrical zero. Both synchros are on electrical zero when the scribe marks on the rotors match the fixed indexes.

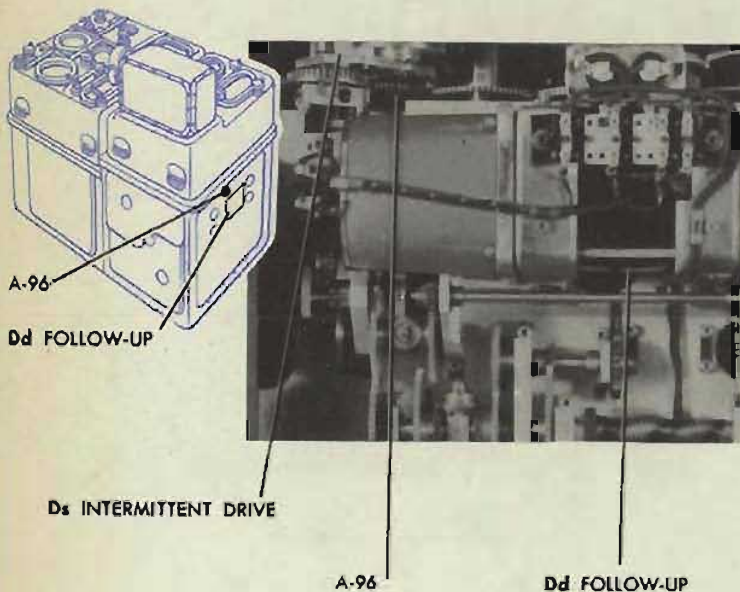
Adjustment

If both synchros are not on electrical zero, make A-95 slip-tight. Hold the counter at 2000' and bring the synchros to electrical zero by turning the V_s input gear.

Tighten A-95 and recheck.
Readjust A-55 and check A-97.



A-96 Ds INTERMITTENT DRIVE to Ds INDICATING COUNTER



Location

A-96 is under cover 7, on the input to the *Ds* intermittent drive. A-96 is omitted on Mods 1, 3, 4, 8, and 12.

Check

Decrease *Ds* and observe the output gear of the intermittent drive. It should stop turning when the *Ds* counter reaches 320 mils. The intermittent drive is then at its low cut-out point.

Adjustment

If the intermittent drive does not cut out when *Ds* reads 320 mils, make A-96 slip-tight.

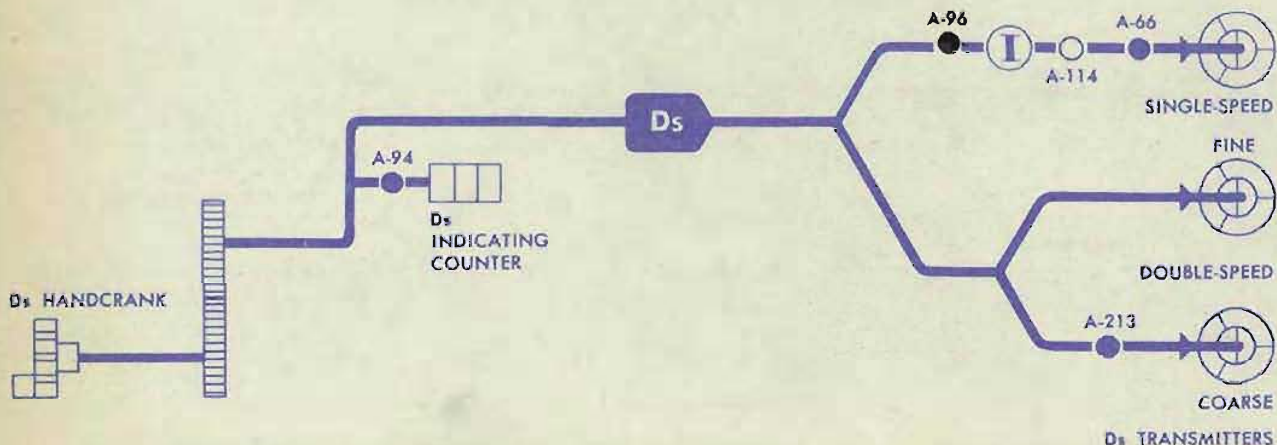
Turn *Ds* in a decreasing direction until the output gear stops turning. Hold the large gear in the intermittent drive and turn the *Ds* handcrank to set the counter at 320.

Tighten A-96.

Recheck

Increase *Ds* until the intermittent drive output gear stops turning. The *Ds* counter should read 680 mils at the upper cutout point of the intermittent drive.

Check A-66.



A-97 V_s INTERMITTENT DRIVE to V_s INDICATING COUNTER

Location

A-97 is under cover 6, 14 inches in from the access space at the top of the P_v transmitter. It is on the input shaft of the V_s intermittent drive. A-97 is omitted on Mods 1, 3, 4, 8, and 12.

Check

Turn the V_s handcrank in a decreasing direction. Observe the output gear of the intermittent drive. It should stop turning when the V_s counter reads 2000'. The intermittent drive is then at its low cut-out point.

Adjustment

If the intermittent drive does not cut out when V_s reads 2000', make A-97 slip-tight.

Turn V_s in a decreasing direction until the drive does cut out. Hold the large gear in the intermittent drive by means of a gear pusher inserted through the access above the D_d follow-up under cover 7.

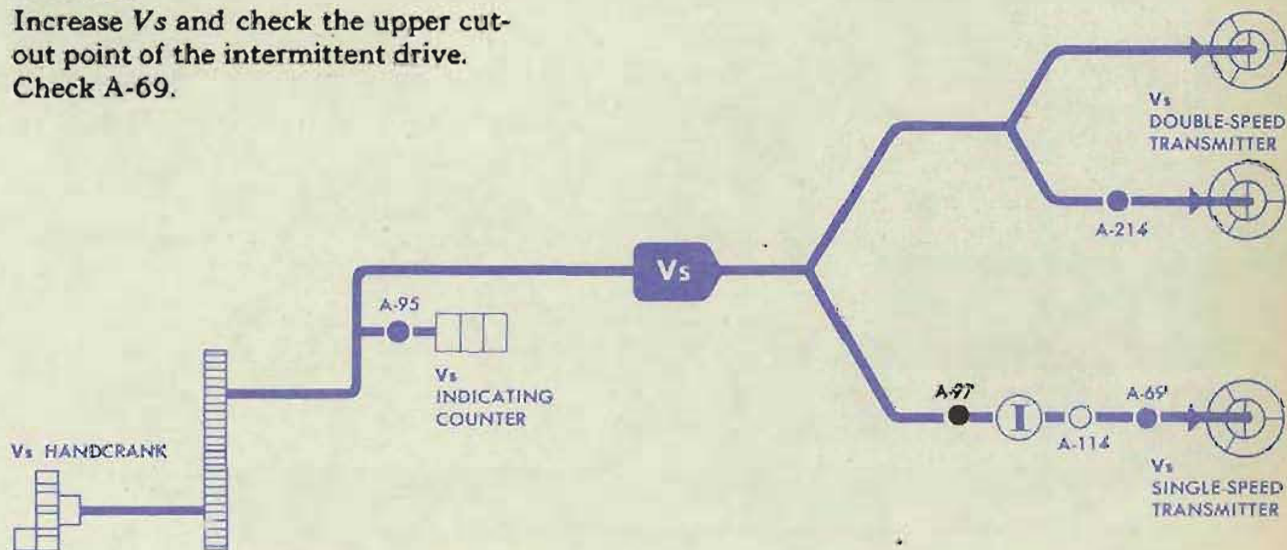
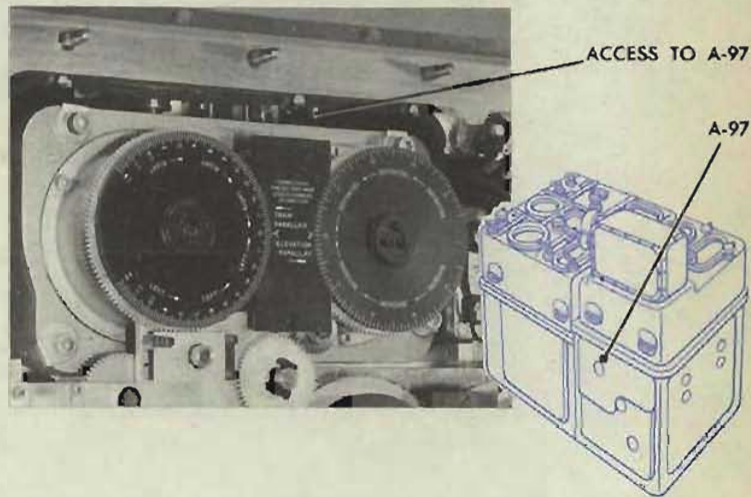
Bring the V_s counter to 2000' with the V_s handcrank.

Tighten A-97.

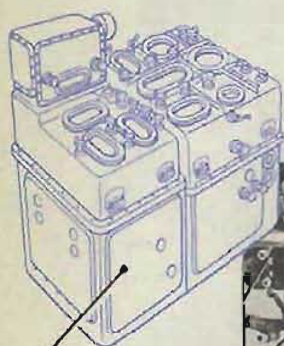
Recheck

Increase V_s and check the upper cut-out point of the intermittent drive.

Check A-69.



A-98 B'gr DIALS to B'r RECEIVER



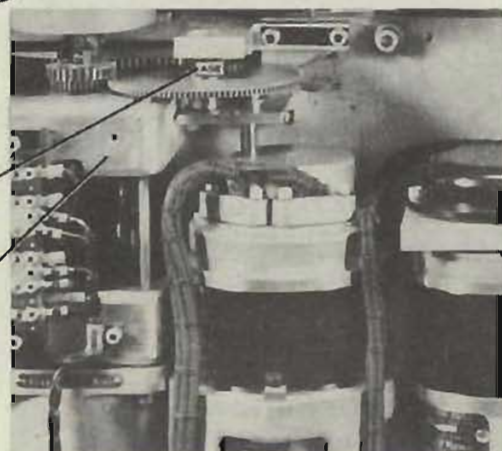
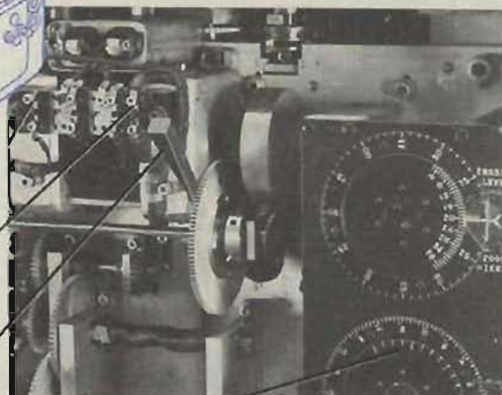
A-98
LEADS
1B AND 1B8

WEDGE
Dd FOLLOW-UP
OUTPUT GEARING

Dd DIALS

A-98

B'r RECEIVER



Location

A-98 is under cover 8 on the response gearing of the B'r receiver.

Check

Remove leads 1B and 1BB from the Dd follow-up. Set Dd at 0° and wedge the output gearing.

Turn the power ON.

Turn the control switch to SEMI-AUTO.

Transmit B'r from the director. Read the value on the B'gr dials. B'gr should match the value of B'r being transmitted from the director.

Adjustment

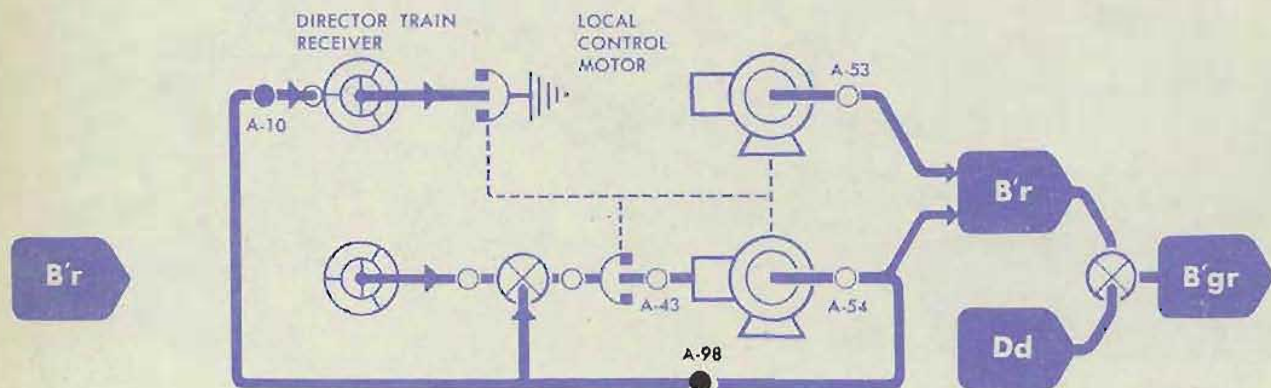
Make A-98 slip-tight.

Turn the gear directly beneath the gear on which clamp A-98 is mounted until the B'gr dials match the value transmitted from the director.

Tighten A-98 and recheck.

Caution

If A-98 is completely loosened, the receiver motor may run away.

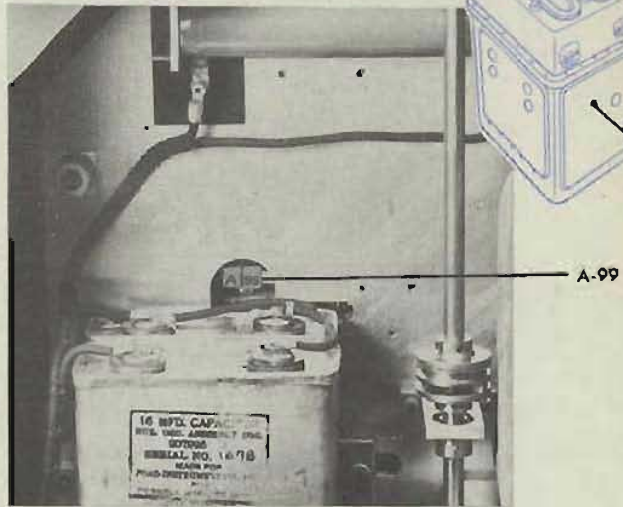
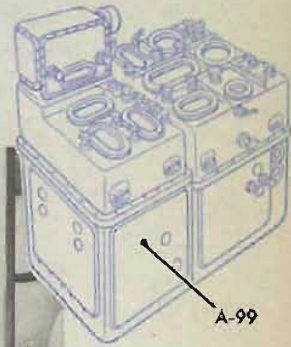


A-99 DECK TILT COMPONENT SOLVER to B'r LINE

Location

A-99 is under cover 8 above the two 16-mfd. capacitors.

The deck tilt component solver is under cover 7. It is visible through the access below the V_z follow-up.



Check

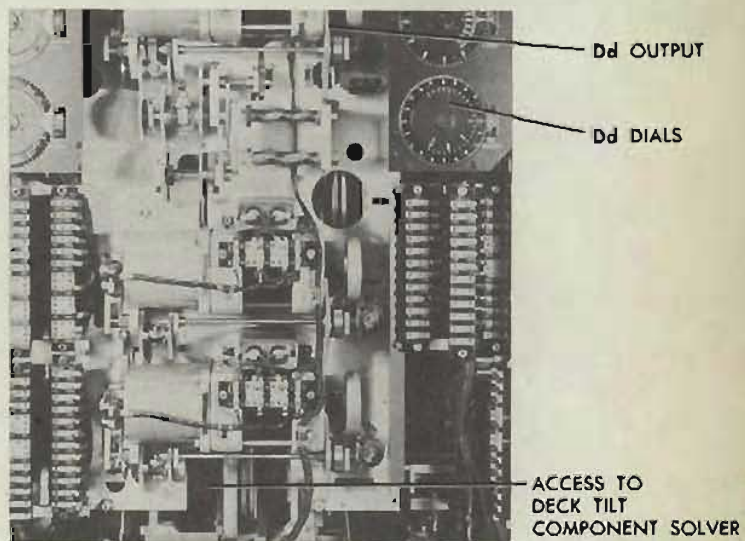
Turn the power OFF.

Set Dd at 0° and wedge the follow-up output gear.

Set $B'gr$ at 45° and wedge the line.

Increase L and observe the motion of the $L \sin 2B'r$ rack of the deck tilt component solver. This is the rack which slides horizontally. It should move toward the rear of the computer as L is increased. If it does not, make both the coarse and fine adjustment given below.

If the direction of travel of the $L \sin 2B'r$ rack is correct, set up a dial indicator to measure motion of the $L \cos 2B'r$ rack (vertical slide). Turn L from limit to limit while observing the dial indicator. There should be no motion of the $L \cos 2B'r$ rack for the entire travel of L . If the rack motion is greater than 0.002 inch, make the fine adjustment given below.



Coarse adjustment

Set L at 3200'.

Loosen A-99, and turn the gear below the clamp until the $L \sin 2B'r$ rack is nearest the rear of the instrument. Make A-99 slip-tight.

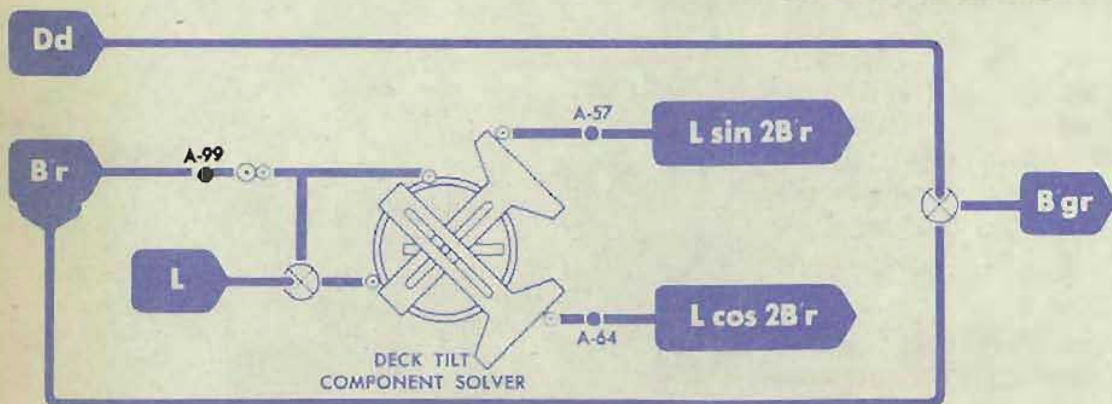
Fine adjustment

Check that Dd is at 0° and $B'gr$ is at 45° . Set L at 2000'.

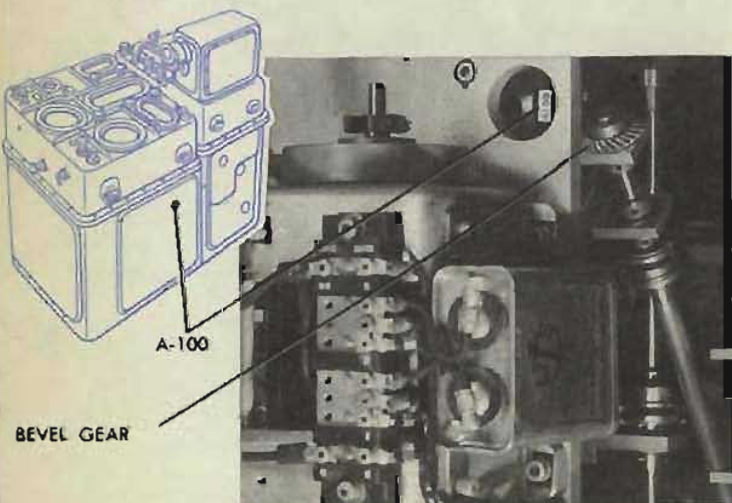
Set up a dial indicator to measure motion of the $L \cos 2B'r$ rack (vertical slide), and observe the reading of the indicator. Increase L slowly, and turn the gear below A-99 to keep the indicator at its original reading. Continue until L has reached its upper limit of travel.

Tighten A-99, and recheck by turning L from its lower limit to its upper limit. There should be no motion of the dial indicator (limit 0.002 inch). Remove the dial indicator and all wedges.

Check A-57 and A-64.



A-100 ELEVATION WIND COMPONENT SOLVER to Ywgr LINE

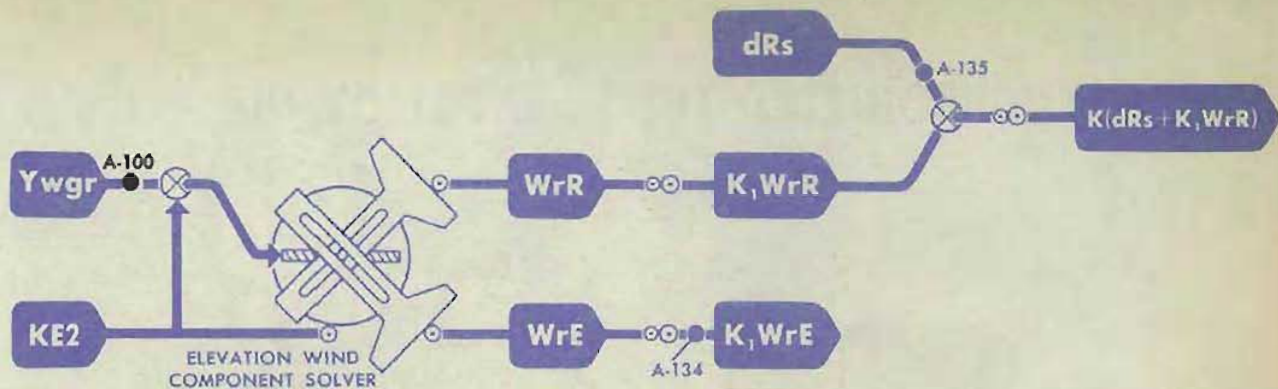


Location

A-100 is under cover 5. It is visible through the small access hole above the $Dtwj$ follow-up.

Check

Set Br at 90° .
 Set Bws at 90° .
 Set So and Sw at 0 knots.
 Set Ds at 500 mils.



Turn the power ON.

The input screw of the elevation wind component solver should be in such a position that rotation of the *E2* line produces no movement of the output racks.

Turn the *E2* line from 0° to 80°.

The *WrR* output rack can be seen under cover 3.

Adjustment

If there is any motion of the *WrR* output rack, make A-100 slip-tight.

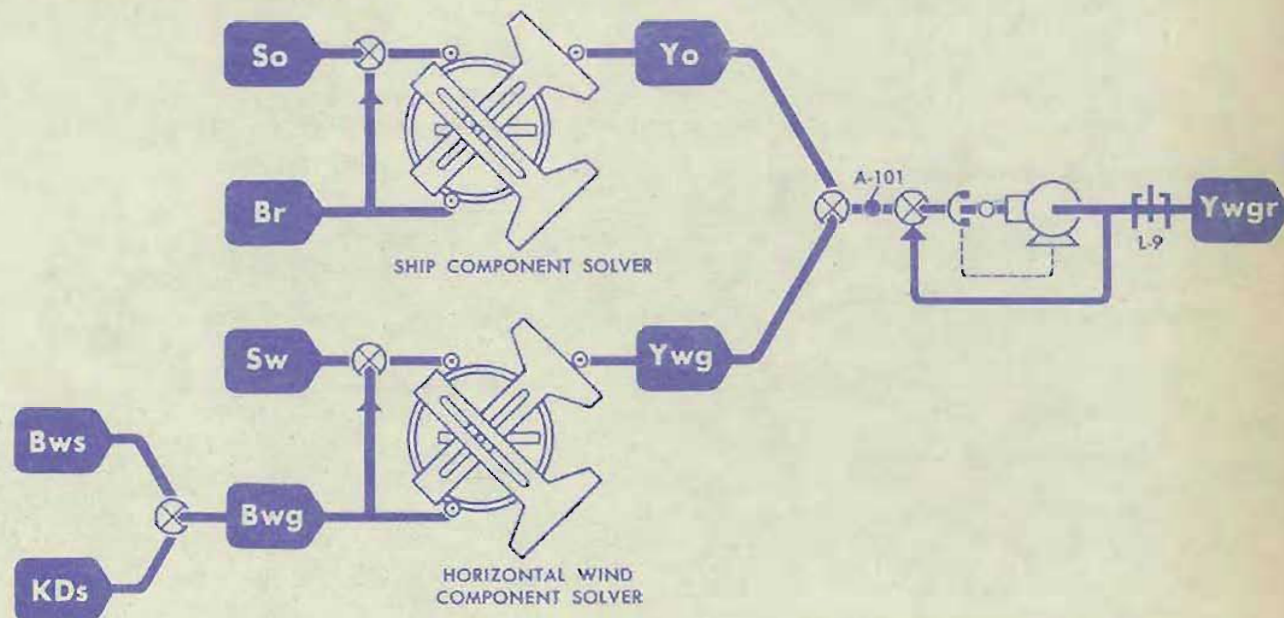
Set *E2* at 78.95° and mark the position of the *WrR* rack.

Turn *E2* to 0°.

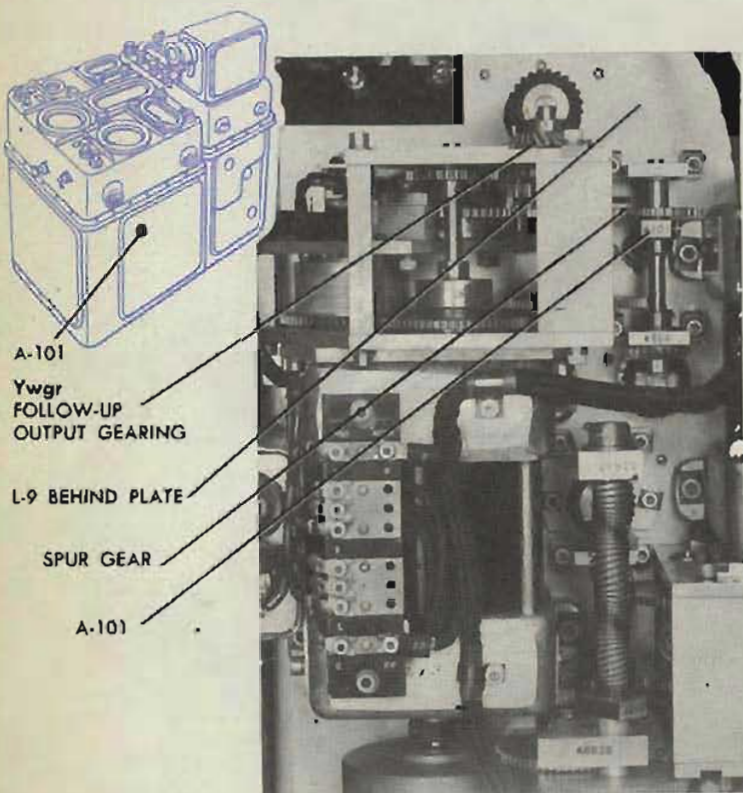
Turn the bevel gear near A-100 until the *WrR* rack is at its original position.

Tighten A-100 and recheck.

Check A-135 and A-134.



A-101 SYNCHRONIZING THE Ywgr FOLLOW-UP



Location

A-101 is under cover 5.

L-9 is behind the top of the follow-up mounting plate. It is in a horizontal position with its lower limit toward the front.

Check

Turn the power ON.

Set *Ds* at 500 mils.

Set *So* at 40 knots, and *Sw* at 60 knots.

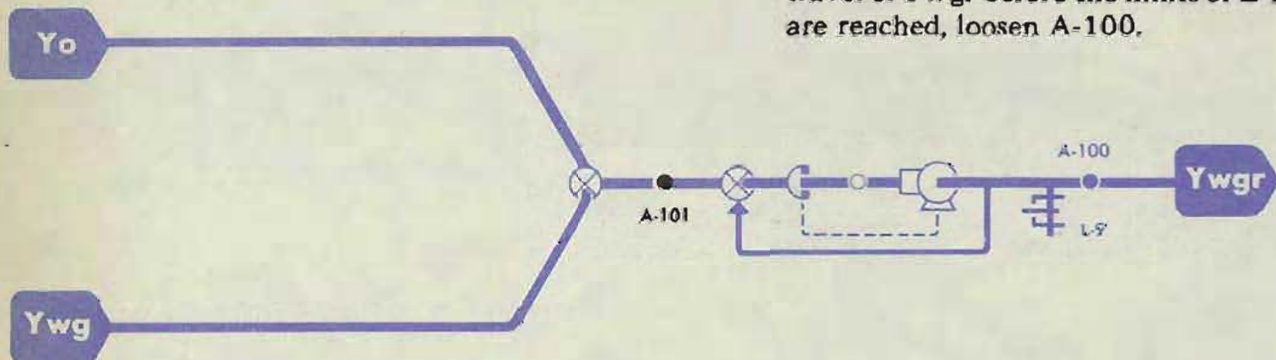
Set *Co*, *Bw*, and *Br* at 0°.

The *Ywgr* follow-up should be synchronized at the lower limit, -100 knots.

CAUTION

Before making this adjustment, turn the power OFF and run *Ywgr* from one limit to the other by turning the *Ywgr* follow-up output gearing.

If there is any interference in the travel of *Ywgr* before the limits of L-9 are reached, loosen A-100.



Adjustment

If the follow-up is not synchronized at the lower limit, make A-101 slip-tight.

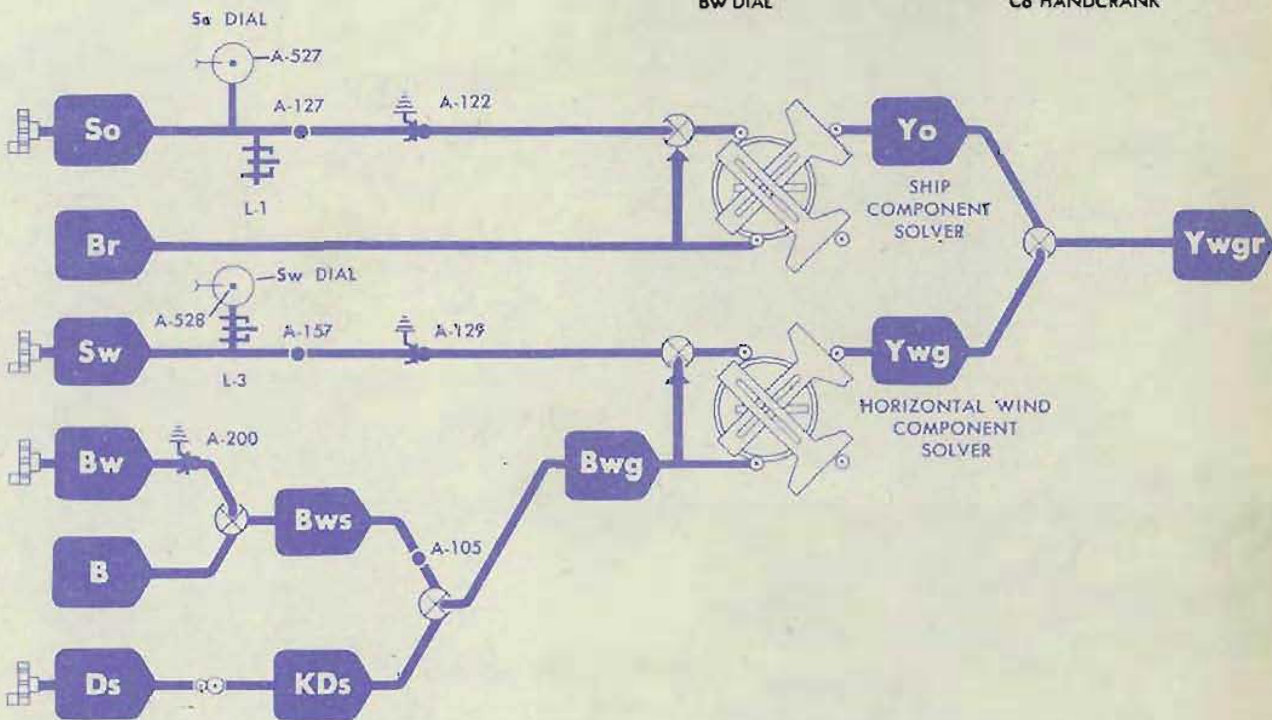
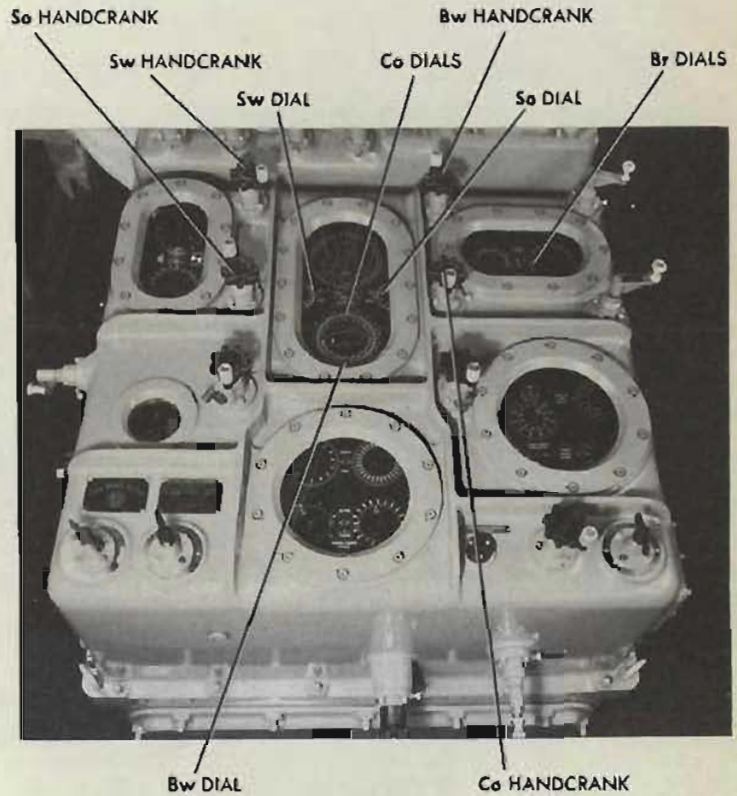
Turn the small spur gear above the clamp until the follow-up is synchronized at the lower limit.

Change *Br* to 180°. The *Ywgr* follow-up should synchronize at the upper limit.

Tighten A-101 and recheck.

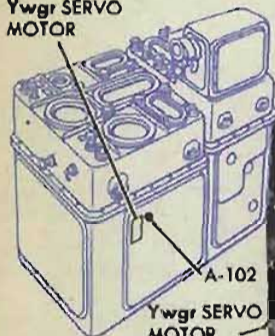
Increase *So* and note the value on the *So* dial at the moment the *Ywgr* follow-up stops driving. Repeat at the lower limit. The *So* dial should read the same value at both limits.

Readjust A-100.



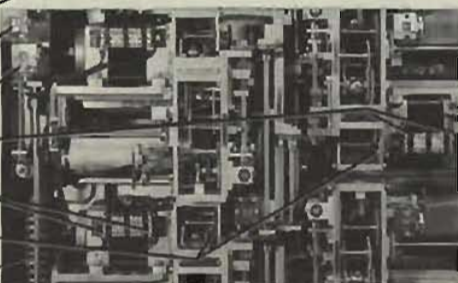
A-102 SYNCHRONIZING THE Dfwj FOLLOW-UP

Ywgr SERVO MOTOR



BEVEL GEAR ABOVE A-102

A-102



Tf/R2 AT 0.00125

Vf+Pe COUNTER AT 0 10

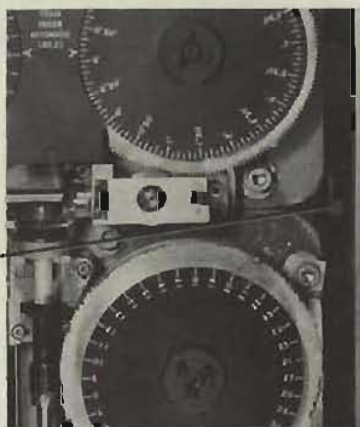
LEADS B AND BB

LEADS C1 AND CC

WEDGES

Vf+Pe SHAFT

Vf+Pe COMPUTER



Ds MASTER COUNTER (UNDER COVER 8)

Location

A-102 is under cover 5, to the rear of the Ywgr servo motor.

Check

Remove leads C1 and CC from the Vf + Pe ballistic computer.

Set the Vf + Pe counter at 100' (010) and wedge the follow-up output gearing.

Remove leads B and BB from the Tf/R2 ballistic computer.

Set the Tf/R2 counter at 0.00125. (On Mods 8 and 12, set Tf/R2 at 0.001184.)

Wedge the follow-up output gearing.

Turn the power ON.

Set So, Sh, and Sw at 0 knots.

Set A, Br, and Bws at 0°.

Set I.V. at 2550 f.s.

Set Dj at 0 mils.

The Ds master counter should read 500 mils.

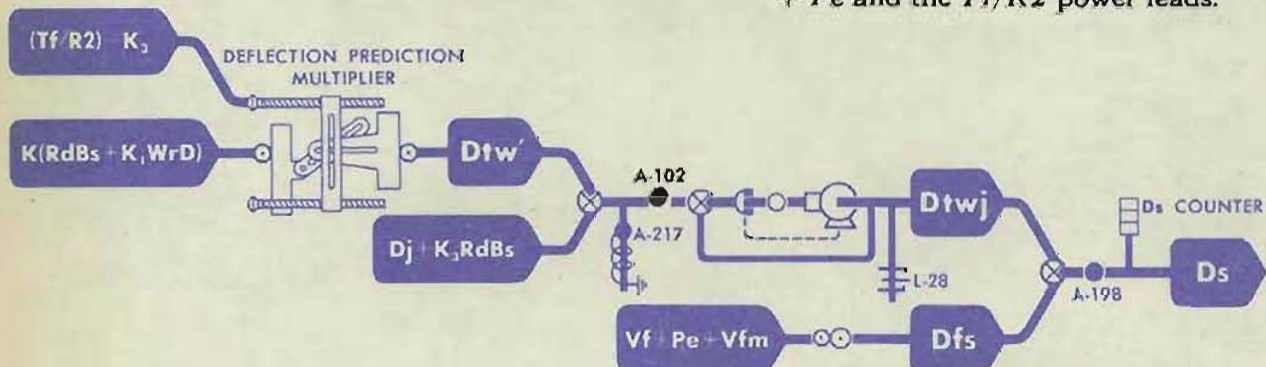
Adjustment

If the Ds counter does not read 500 mils, make A-102 slip-tight.

Hold the bevel gear 1½ inches above A-102, and turn the spur gear under A-102 until the Ds master counter reads 500 mils.

Tighten A-102 and recheck.

Remove the wedges. Replace the Vf + Pe and the Tf/R2 power leads.



A-103 SYNCHRONIZING THE V FOLLOW-UP

Location

A-103 is under cover 5, to the rear of the *V* follow-up, 2 inches in from A-221.

The *Vs* master counter is under cover 6, behind the *Eb* servo motor.

Check

Remove leads C1 and CC from the *Vf + Pe* follow-up motor. Set *Vf + Pe* at 0 by turning the shaft leading to the counter. Wedge the gearing.

Remove leads B and BB from the *Tf/R2* follow-up motor. Set *Tf/R2* at its lower limit and wedge the line.

Turn the power ON.

Set *So*, *Sh*, *dH*, and *Sw* at 0 knots.

Set *A*, *Br*, and *Bws* at 90°.

Set *Vj* at 0 mils, *Ds* at 500 mils, and *I.V.* at 2550 f.s.

The *Vs* master counter should read 2000'.

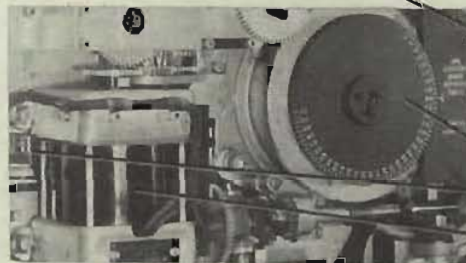
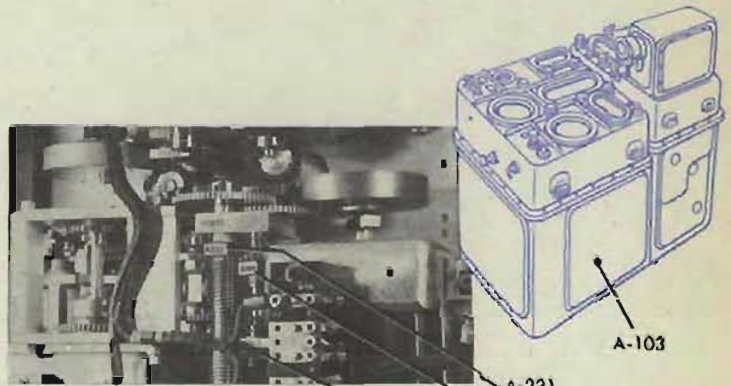
Adjustment

If the *Vs* counter does not read 2000', make A-103 slip-tight.

Hold the bevel gear 1 1/2 inches below A-103, and turn the spur gear above A-103 until the *Vs* master counter reads 2000'.

Tighten A-103 and recheck. All quantities must remain at the required values.

Remove the wedges. Replace the leads on the *Vf + Pe* and *Tf/R2* follow-ups.



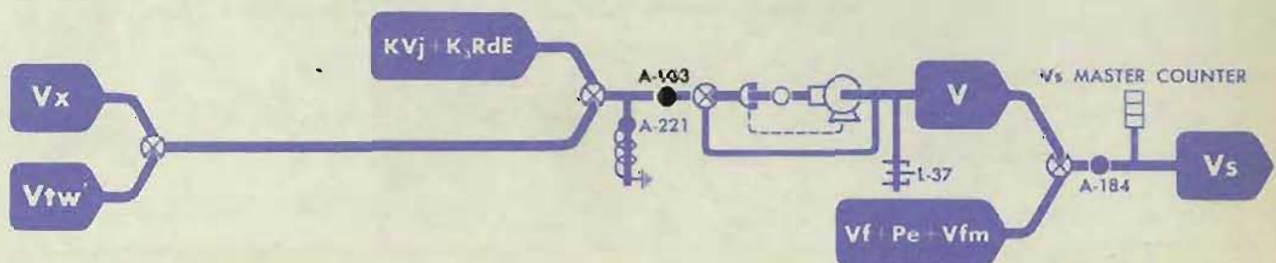
- A-103
- BEVEL GEAR
- E'g DIALS
- Vs* MASTER COUNTER
- Eb* SERVO



- Tf/R2* BALLISTIC COMPUTER
- LEADS B AND BB
- WEDGE
- LEADS C1 AND CC
- Vf + Pe* BALLISTIC COMPUTER



- Tf/R2* COUNTER
- Vf + Pe* COUNTER
- SHAFTS TO COUNTERS



A-104 SYNCHRONIZING THE R2 FOLLOW-UP

Location

A-104 is under cover 5, at the side of the R2 follow-up.

Check

Turn the power ON.

Set S_o , S_h , dH , and S_w at 0 knots.

Set $I.V.$ at 2550 f.s.

Set A , Br , and Bws at 90° .

Set R_j at 0 yards.

Set Tf at 5 seconds. (On Mods 8 and 12, set Tf at 8 seconds.) To set the Tf counter, disconnect leads A and AA, and turn the Tf follow-up output gearing. Then wedge the line.

Set cR at 10,000 yards.

The R2 follow-up should be synchronized and the R2 counter in the Tf ballistic computer should read 10,000 yards.

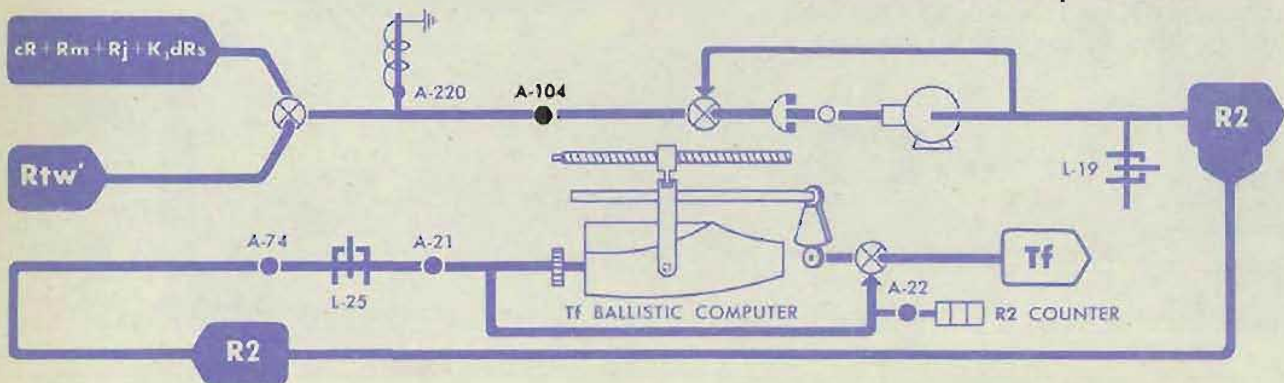
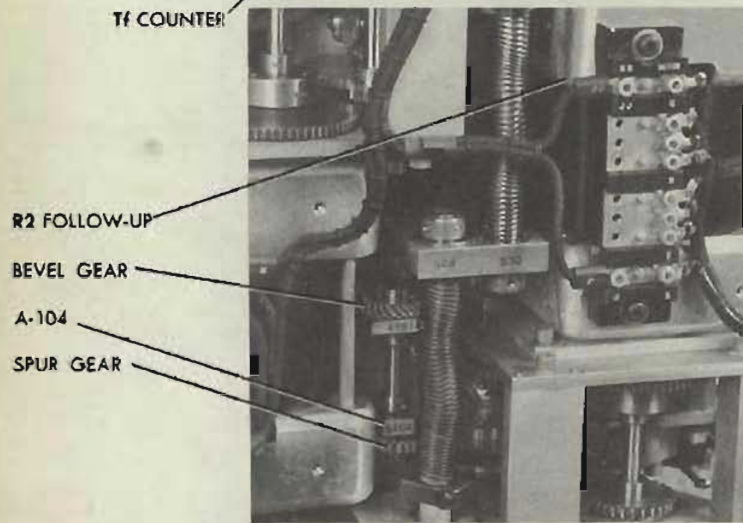
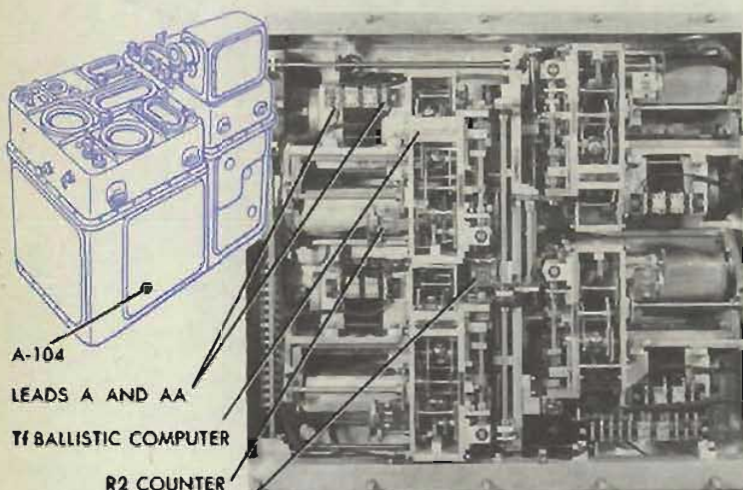
Adjustment

If the R2 counter does not read 10,000 yards, make A-104 slip-tight. Use a gear pusher to hold the bevel gear $1\frac{1}{2}$ inches above the clamp, and use another gear pusher to turn the spur gear below the clamp, until the master R2 counter reads 10,000 yards.

Tighten A-104 and recheck.

Remove the wedge from the Tf follow-up output gearing.

Reconnect the Tf power leads.



A-105 HORIZONTAL WIND COMPONENT SOLVER to Bws DIAL

Location

A-105 is under cover 5.

Check

Turn the power ON.

Set *Ds* at 500 mils.

Set *B* at 0°.

Set *Bw* at 90°.

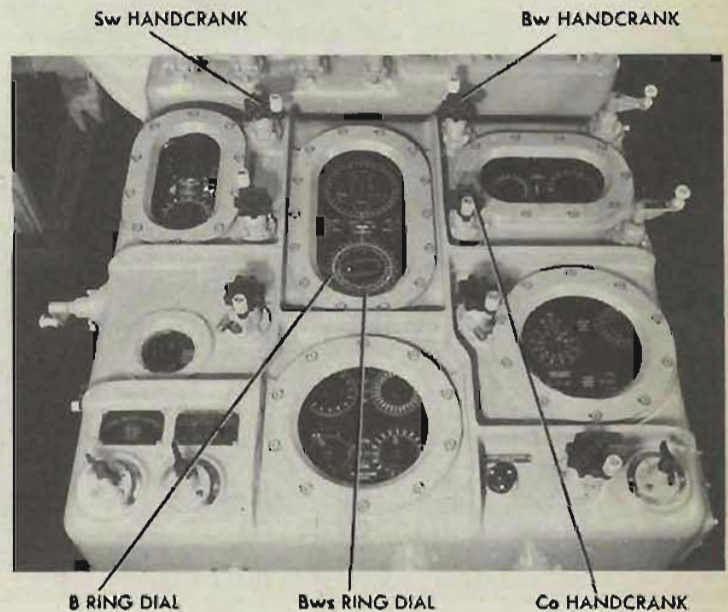
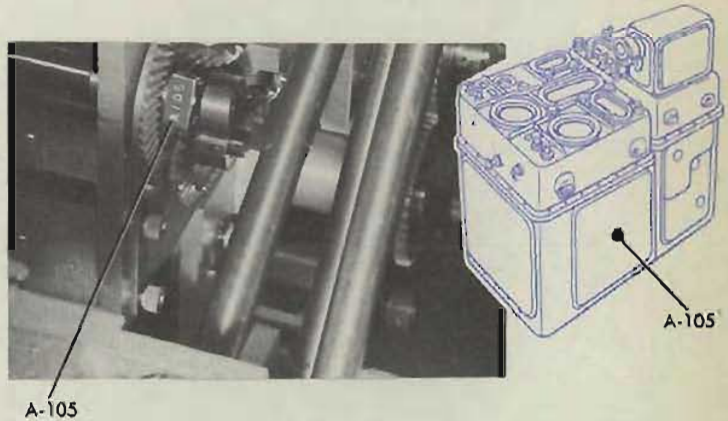
The slot in the vector gear of the horizontal wind component solver should be positioned downward.

Mark the *Ywgr* follow-up output gearing for use as an indicator. Turn *Sw* from 0 to 60 knots.

There should be no output from the *Ywg* output rack.

If the slot is correctly positioned, the *Xwg* output rack moves down as *Sw* is increased. The *Ywg* rack should not move.

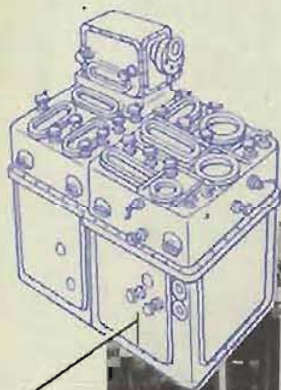
Output on the *Ywg* rack can be checked by movement of the *Ywgr* follow-up output gearing.



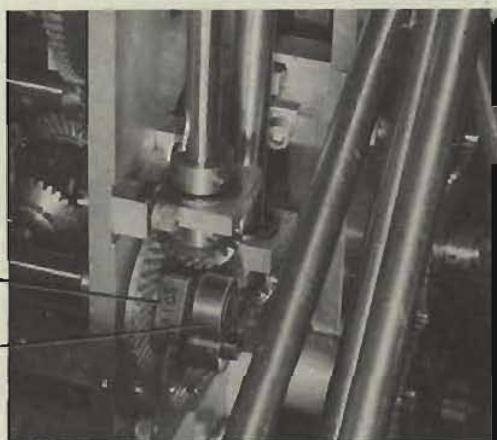
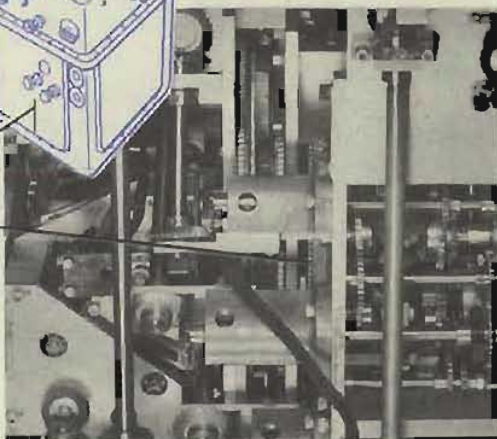
CAUTION

Before making this adjustment, turn *Ywgr* from one limit to the other by means of the *Ywgr* follow-up output gearing with the power OFF.

If there is any interference in the travel of *Ywgr* before the limits are reached, loosen A-100.



Xwg
OUTPUT RACK



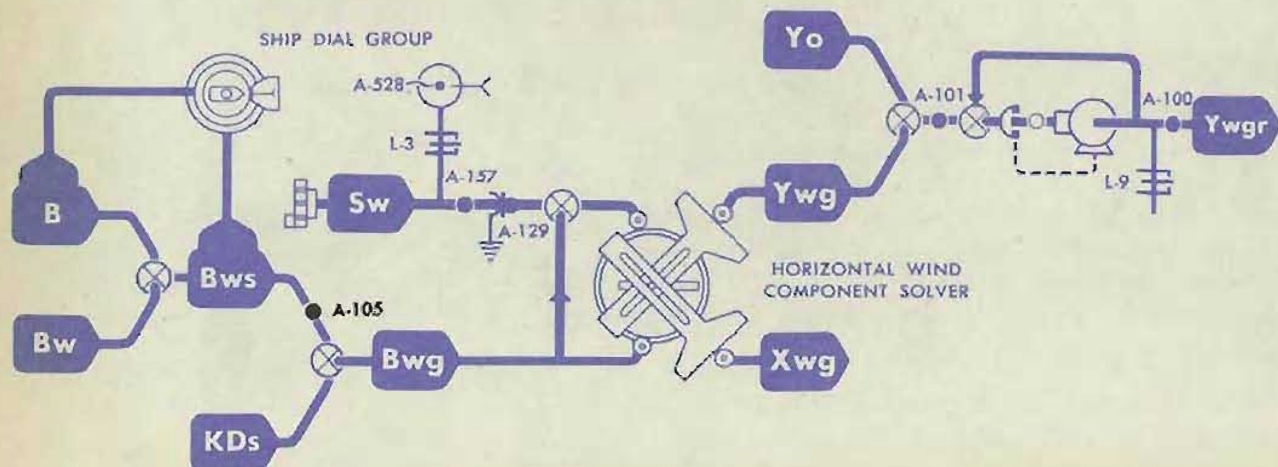
A-105
COLLAR

Adjustment

If *Xwg* does not move down, or if there is any output on the *Ywgr* follow-up as *Sw* is increased from 0 to 60 knots, make A-105 slip-tight. Move the vector gear until there is no output of *Ywg* for an input of *Sw*, and until the *Xwg* rack moves down when *Sw* is increased.

To move the vector gear, turn the collar next to A-105. *Bw* must not move off 90°. Tighten A-105, and recheck.

Check A-101, A-131.



A-106 ELEVATION WIND COMPONENT SOLVER to E2 COUNTER

Location

A-106 is under cover 5, at the lower center.
The E2 master counter is under cover 4.

Check

Turn the power OFF.

Remove leads F and FF from the Ywgr follow-up. Remove leads A and AA from the T_i follow-up.

Set E2 at 0°, with the sync E hand-crank at CENTER.

The elevation wind component solver vector gear should be positioned with the gear end of the lead screw at the top.

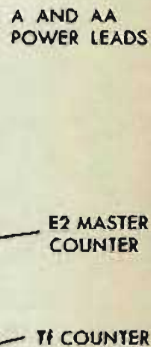
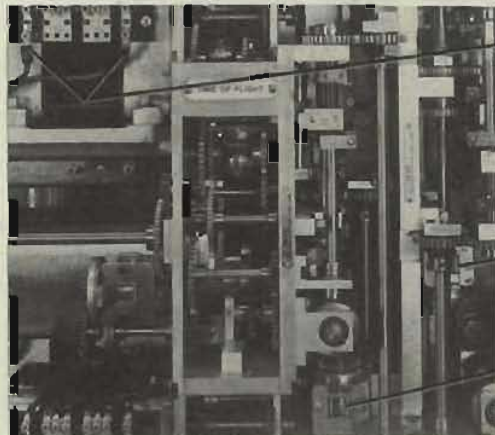
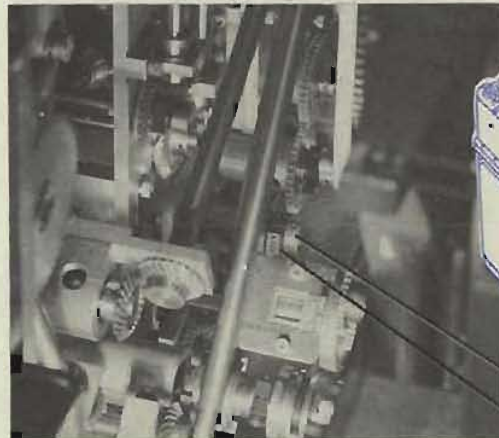
Set E2 at 78.947°. (On Mods 8 and 12, set E2 at 80.496°.)

Turn the Ywgr follow-up output line from limit to limit.

There should be no output of the WrR rack. The WrR rack can be seen from the left side of the instrument. If there is any apparent motion of the WrR rack, A-106 should be readjusted.

Adjustment

Loosen A-106. Turn the collar next to A-106 to position the vector gear, with the gear end of the lead screw toward the right of the instrument, until there is no output on the WrR rack for the entire travel of Ywgr. Tighten A-106.



Refining the adjustment

Turn the power ON.

Set *Tf* at its upper limit and wedge the gearing.

Set *E2* at 78.947°. (On Mods 8 and 12, set *E2* at 80.496°.)

Turn the *Ywgr* follow-up output gearing to one limit.

Mark a gear in the *R2* follow-up output gearing as an indicator.

Turn *Ywgr* to the other limit. If the *R2* indicating gear moves more than 2 teeth, loosen A-106. Turn the collar next to the clamp until the indicating gear has returned halfway to its original position. Tighten A-106 and re-check.

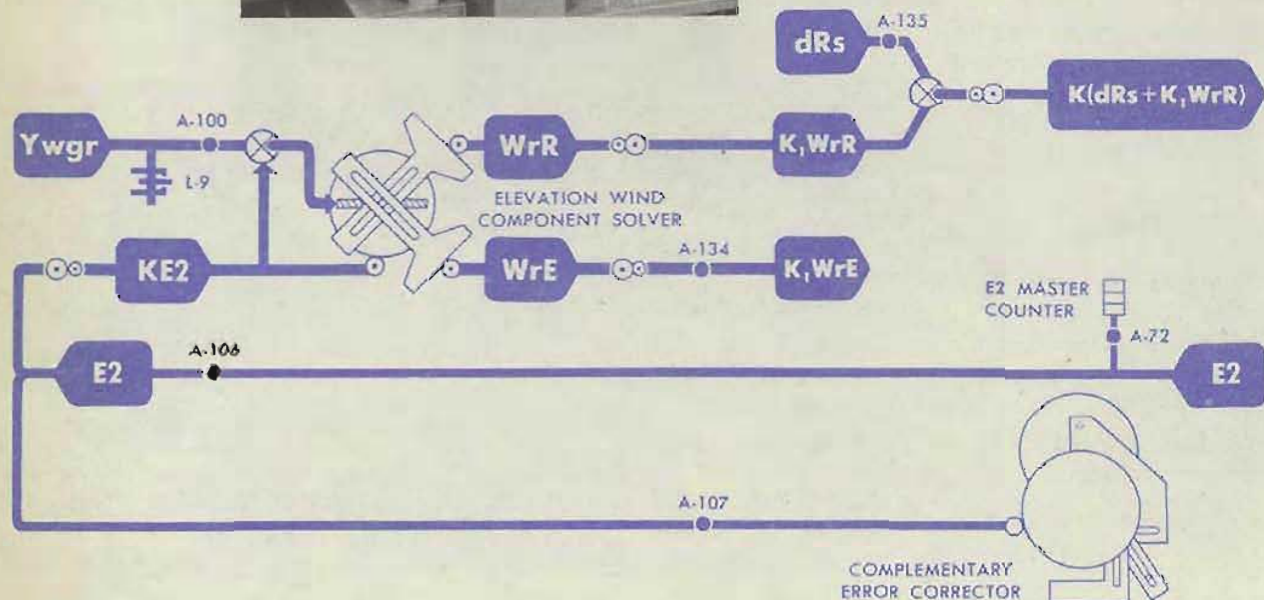
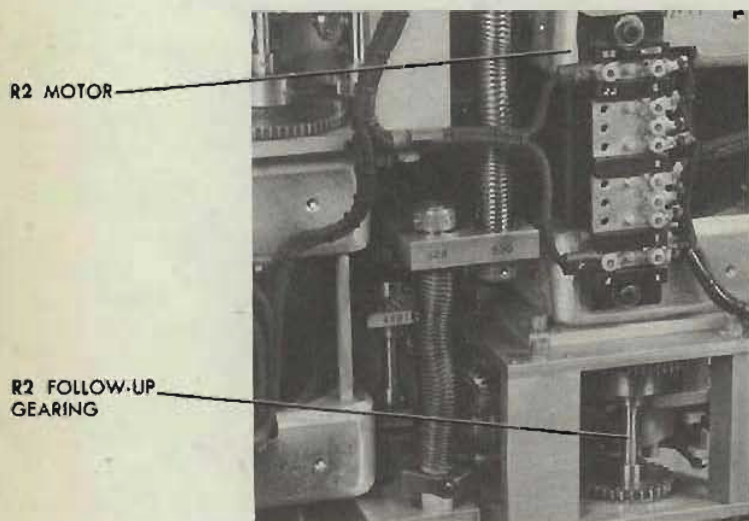
Check that *E2* is at 78.947°. (On Mods 8 and 12, check that *E2* is at 80.496°.) Check that the gear end of the lead screw is toward the right.

Turn the power OFF.

Remove the wedge from the *Tf* gearing.

Reconnect the leads on the *Ywgr* and *Tf* follow-ups.

Check A-134 and A-135.



A-107 COMPLEMENTARY ERROR CORRECTOR to E2 COUNTER

Location

A-107 is under cover 5, 20 inches in from the side, and 2 inches above the deck plate.

Check

Turn the power ON.

- Set *I.V.* at 2550.
- Set *So*, *Sh*, *Sw*, and *dH* at 0 knots
- Set *Vj* at 0.
- Set *Ds* at 500 mils.

Remove leads C1 and CC from the *Vf + Pe* follow-up. Set the *Vf + Pe* counter at 0 and wedge the line.

Set the *E2* master counter at 80° , with the sync *E* handcrank at CENTER.

Pull the *Vs* handcrank OUT. The *Vs* counter should read 2000'. (If it does not, check A-103.)

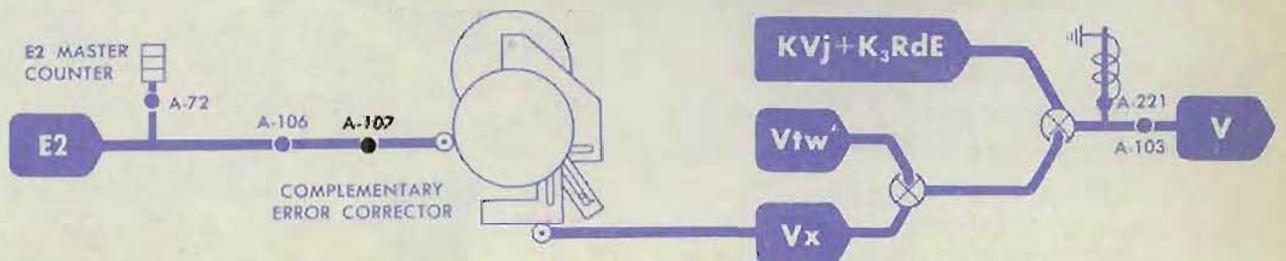
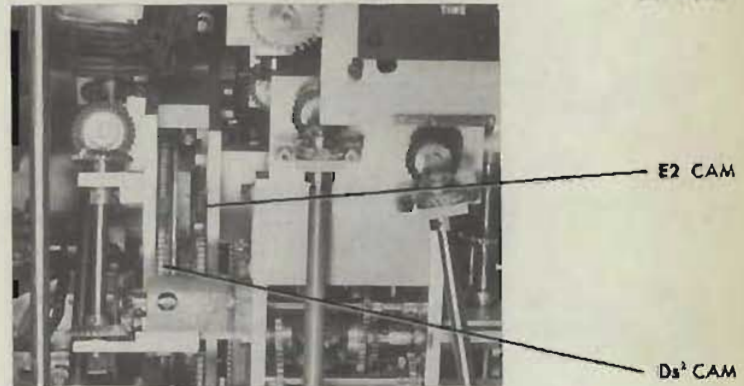
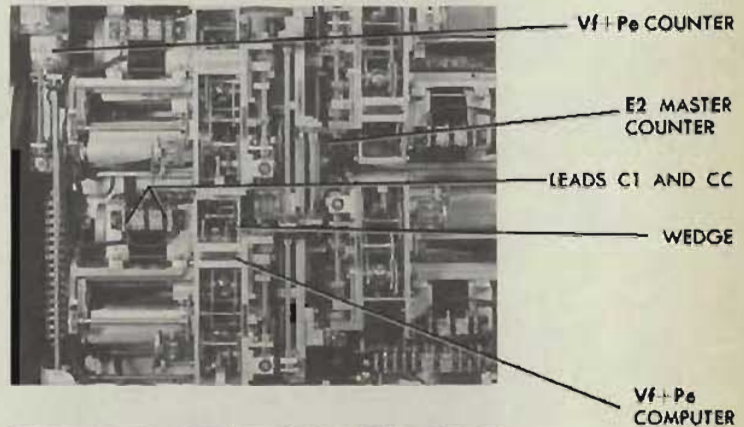
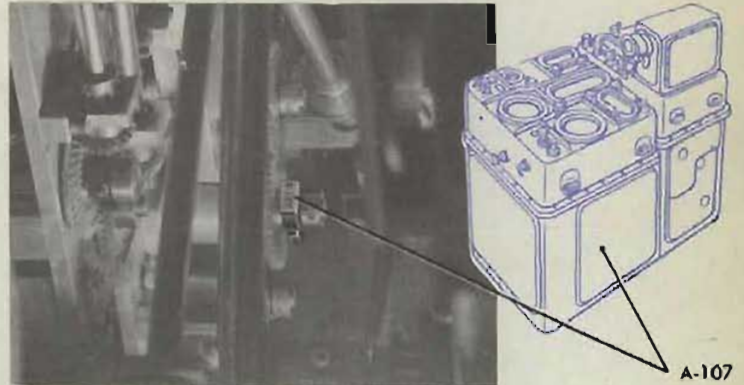
Set *Ds* at 100 mils or 900 mils. The *E2* master counter should read $67.25^\circ (\pm 0.05^\circ)$.

Adjustment

If the *E2* counter does not read $67.25^\circ (\pm 0.05^\circ)$, slip-tighten A-107. Turn the *E2* cam until the counter reading is correct. Tighten A-107 and recheck.

Remove the wedge.
Replace the *Vf + Pe* power leads.

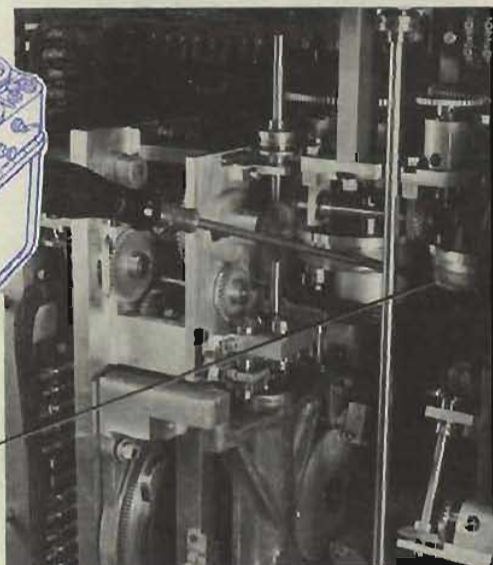
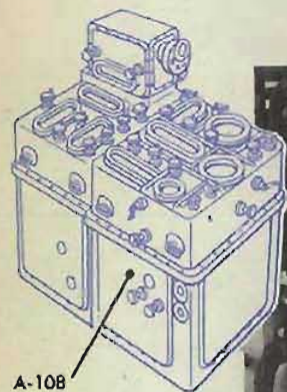
Check A-103.



A-108 and RANGE RATE CORRECTOR to RdE LINE

and

A-109 RANGE RATE CORRECTOR to RdBs LINE



A-108

SCREW DRIVER
INSERTED IN A-108

Location

A-108 is under cover 3 at the left center of the front pedestal section. It is above the coupling on a diagonal shaft, and can be reached by a long screw driver.

A-109 is under cover 5. It is above the coupling on a vertical shaft.

The range rate corrector is under cover 5, behind the mounting plate of the R2 follow-up. The range rate corrector can be reached by hand.

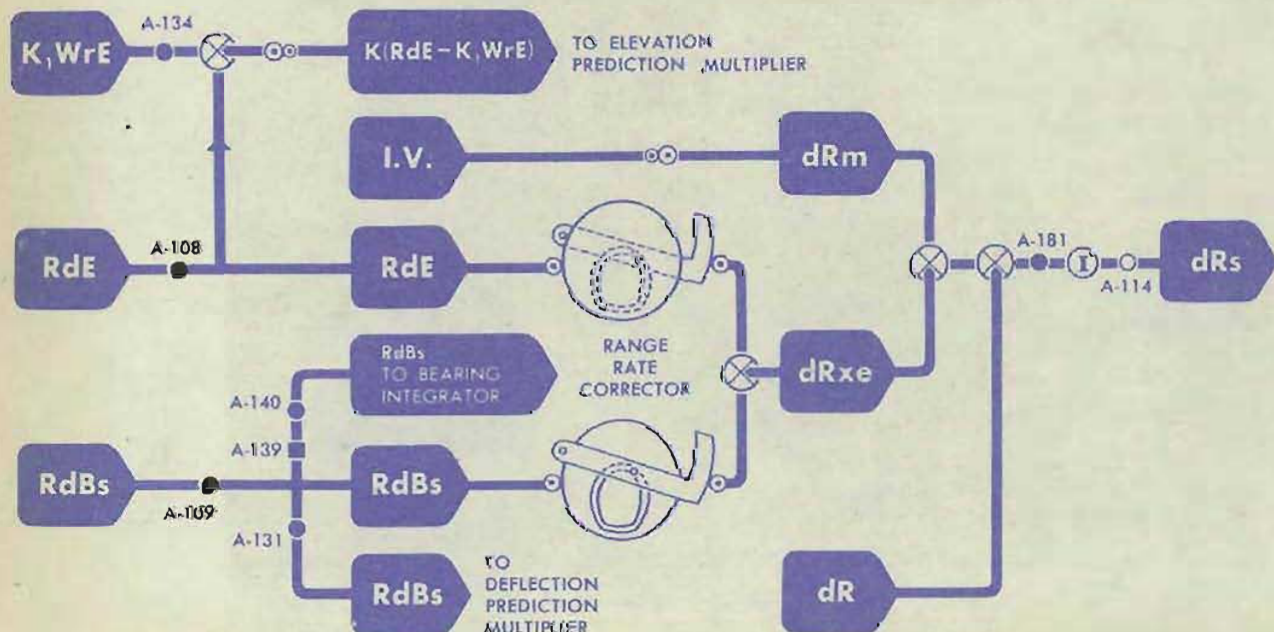
Check

Turn the power ON.

Set S_0 and S_h at 0 knots.

Set dH at 0 knots.

Both the RdE and $RdBs$ lines are now at their zero positions and **MUST REMAIN SO POSITIONED** during this check and adjustment.



The *RdBs*² cam and the *RdE*² cam of the range rate corrector should now be at their zero positions, where a 1/16-inch setting rod can be inserted through the hole in both followers and cams and the mounting plate between them.

Adjustment

If the rod goes through the *RdE*² cam follower, but cannot continue through the *RdE*² cam, loosen A-108. Move the *RdE*² cam until the rod can be inserted. Tighten A-108. The hole in the *RdE*² cam is in the section of the cam groove closest to the center of the cam.

With the rod through the *RdE*² cam, try to insert it through the *RdBs*² cam. If it cannot be inserted, loosen A-109. Turn the input to the *RdBs*² cam until the rod can be inserted through the holes in the *RdBs*² follower and cam. Tighten A-109. The rod will go in approximately 2 inches when inserted through both cams and both followers.

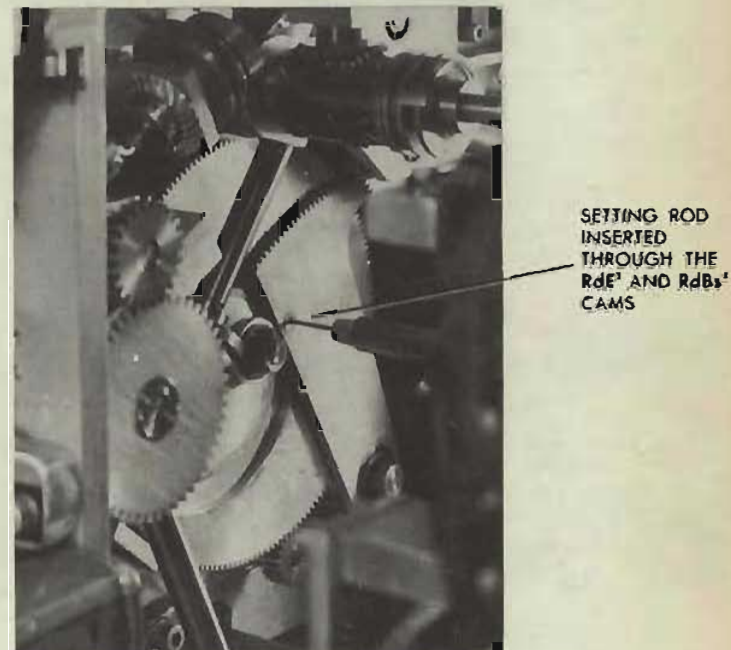
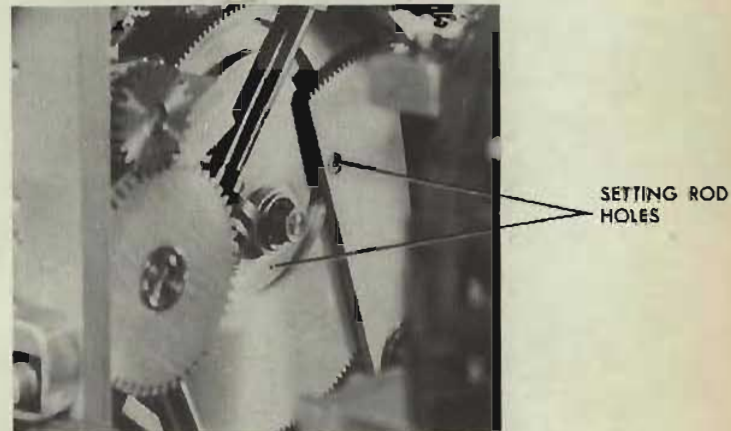
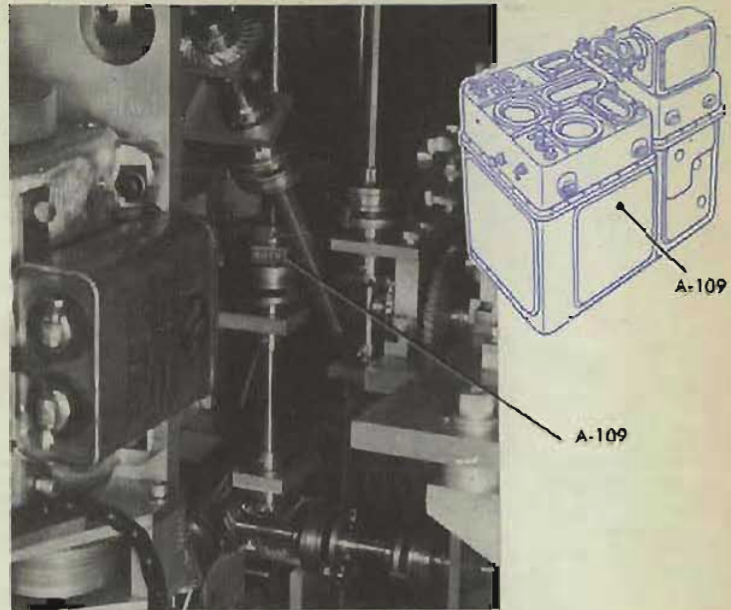
REMINDER: Remove the setting rod.

Check the *RdBs* and *RdE* lines for restrictions or interference by turning the power OFF and turning the output gearing of the *RdBs* and *RdE* follow-up by hand from one limit to the other. This must be done because the adjustments of A-109 and A-108 control the *RdBs* and *RdE* inputs to other units.

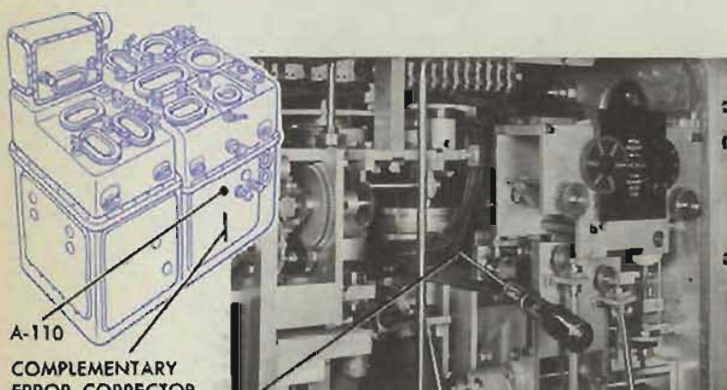
CAUTION

Do not turn any handcranks while the setting rod is in the cams. Remove the rod immediately on completion of the adjustment or serious damage will result.

If A-108 is readjusted, check A-134 and A-181. If A-109 is readjusted, check A-131, A-139, A-140, and A-181.



A-110 COMPLEMENTARY ERROR CORRECTOR to D_s COUNTER



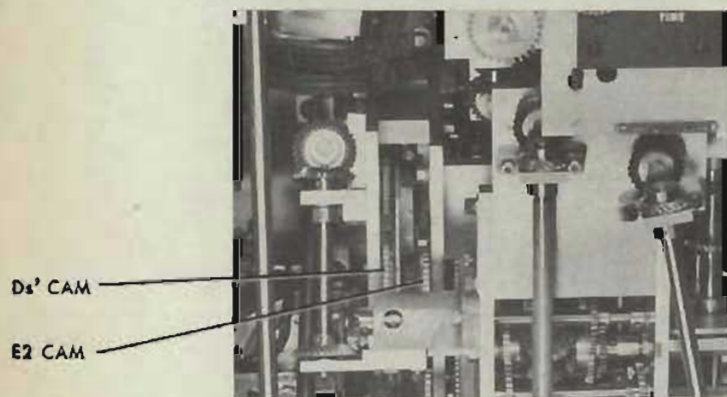
A-110
COMPLEMENTARY
ERROR CORRECTOR

SCREW DRIVER
INSERTED IN A-110

V_f+P_e COUNTER

V_f+P_e OUTPUT
GEARING WEDGED

POWER LEADS C1
AND CC



D_s' CAM

E2 CAM

Location

A-110 is under cover 3, 10 inches from the top, 14 inches in from an access behind the I.V. dial.

Check

Remove leads C1 and CC from the V_f + P_e follow-up. Set the V_f + P_e counter at 0 and wedge the line.

Turn the power ON.

Set I.V. at 2550.

Set S_o, S_h, S_w, and dH at 0 knots. Set V_j at 0.

Set D_s at 500 mils.

Set E2 at 80°, with the sync E handcrank at CENTER.

Pull the V_s handcrank OUT. The V_s indicating counter should read 2000'. (If it does not, check A-103.)

Set D_s at 100 mils and read the V_s counter.

Set D_s at 900 mils and read the V_s counter.

V_s should have *increased*, and then *decreased* to the same reading that was shown when D_s was at 100 mils.

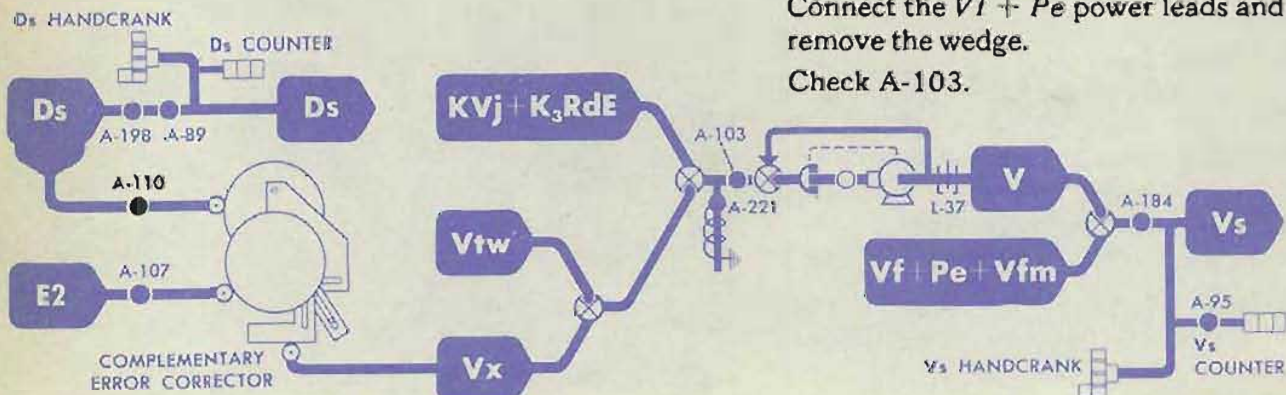
Adjustment

If the V_s counter does not read the same with D_s at 100 and 900 mils, slip-tighten A-110. Turn the D_s' cam until an equal value of V_s is obtained for D_s settings of 100 and 900 mils. V_s should *decrease* when D_s is either increased or decreased from 500 mils.

Tighten A-110 and recheck.

Connect the V_f + P_e power leads and remove the wedge.

Check A-103.



A-111 $Z_d (L - L \cos 2B'r)$ MULTIPLIER to Z_d DIALS

Location

A-111 is under cover 7, below the V_z motor.

Rough check

Set Dd at 0.

Remove leads 1B and 1BB from the Dd follow-up. Wedge the output gearing.

Turn the power ON.

Turn the control switch to SEMI-AUTO.

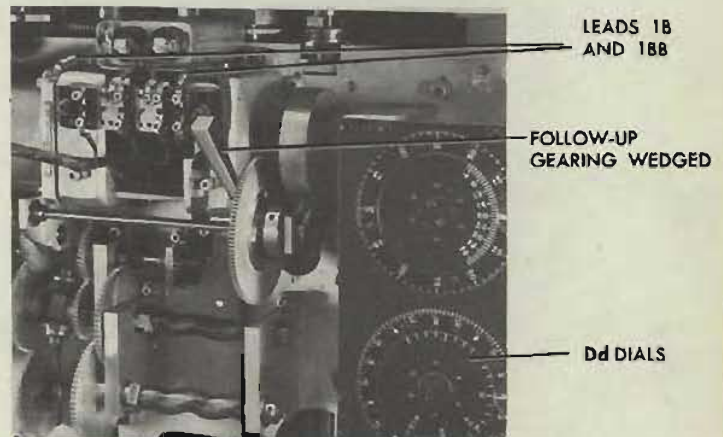
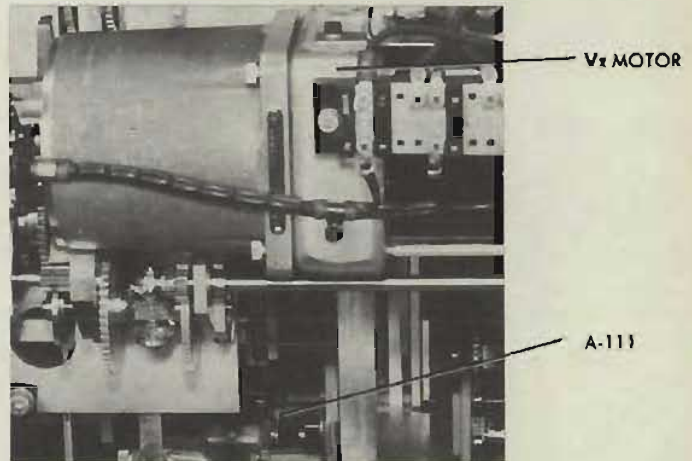
At the switchboard, turn off the $B'r$ receiver switch.

Set Z_d at 2000' and wedge the line.

Set $B'gr$ at 90° .

The Z_d input to the multiplier should be at its zero position. Full travel of L should cause no motion of the output slide of the multiplier.

Motion of the output slide can be seen on the spider of D-3, in front of the $jB'r$ contact assembly.



Refined check

Remove leads 1B and 1BB from the Dd follow-up. Set the Dd dials at 0° and wedge the output gearing.

Turn the power ON.

At the switchboard, turn off the $B'r$ receiver switch.

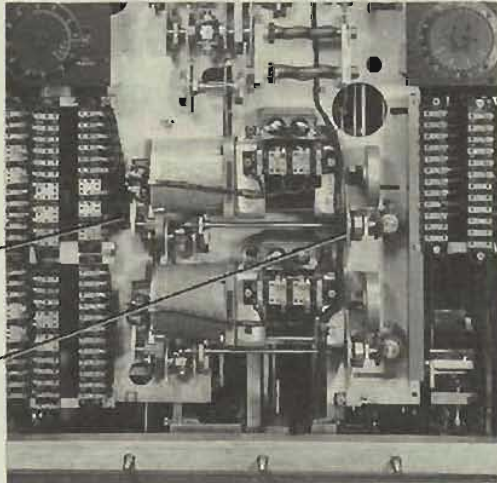
Turn the control switch to SEMI-AUTO.

Set Z_d at 2000'.

Set $B'gr$ at 90° .

Set L at 2000'.

Loosen A-62 and wedge the gear on which the clamp is located.



ACCESS TO A-62
AND TO D-3

jB'r FOLLOW-UP
OUTPUT GEAR

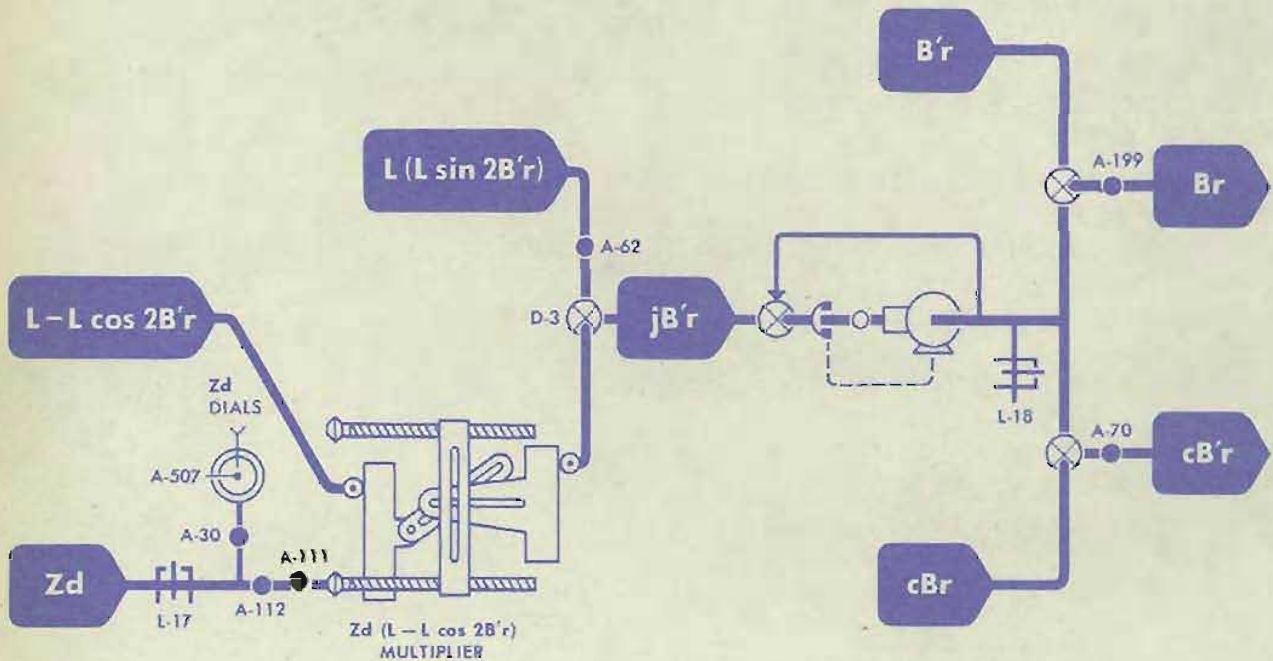
Mark the $jB'r$ follow-up output gear as an indicator.
Turn L to 3500'.
The indicating mark should not move more than one tooth.

Adjustment

If the indicating mark moves more than one tooth, loosen A-111. Hold Zd at 2000', and move the bevel gear next to A-111 with a gear pusher until the marks match. Tighten A-111, and recheck with L at 500'.

Remove the wedges and reconnect the leads to the Dd follow-up.

Readjust A-62.



A-112 $Zd^2 \tan (Eb + Vs)$ MULTIPLIER to Zd DIALS

Location

A-112 is under cover 7, and can be reached through the opening below the Vz servo motor.

Check

Turn the power ON.

Set Vs at 2000'.

Set Ds at 500 mils.

Set E at 60° with the sync E handcrank at CENTER.

Match the sync E dials at the fixed index with the handcrank OUT.

Increase Zd to 3200', and read Vz .

The reading on the Vz dials should be positive.

Decrease Zd to 800'. The reading on the Vz dials should be the same positive value as before.

If Vz has different values, or if it is negative, A-112 is in error and should be readjusted.

Adjustment

The Zd^2 cam should be adjusted to obtain the same positive output for equal plus and minus inputs of Zd .

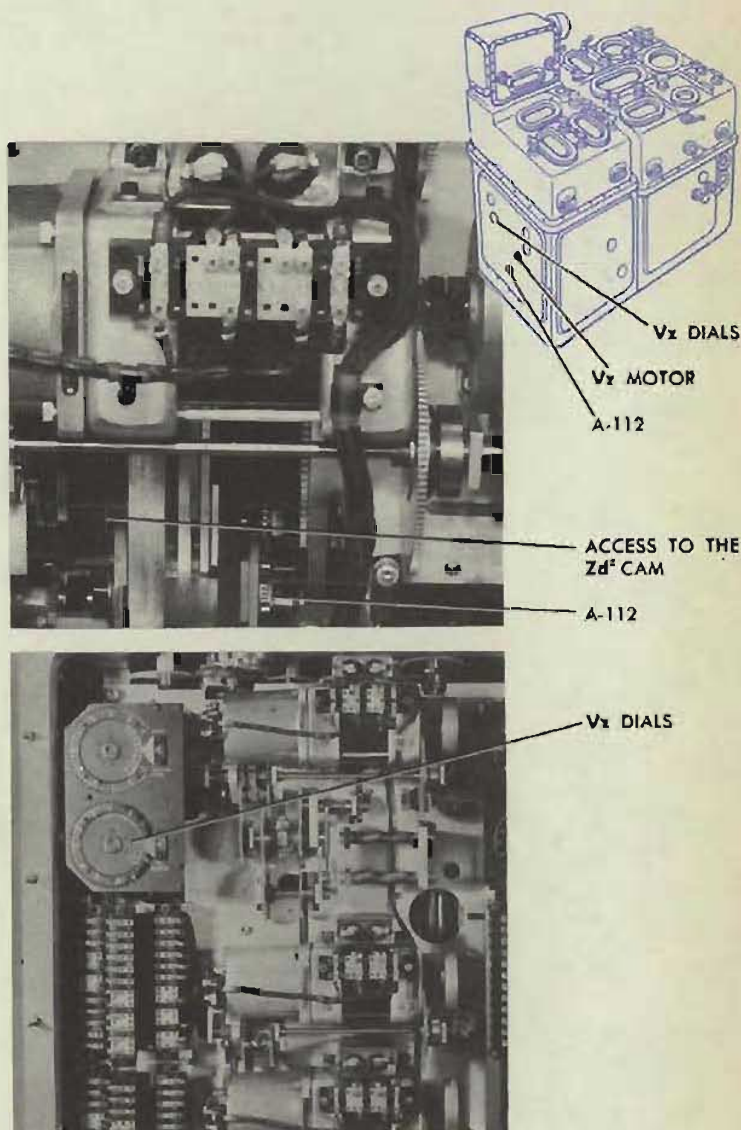
The Zd^2 cam can be reached through the opening 3 inches to the right of A-112.

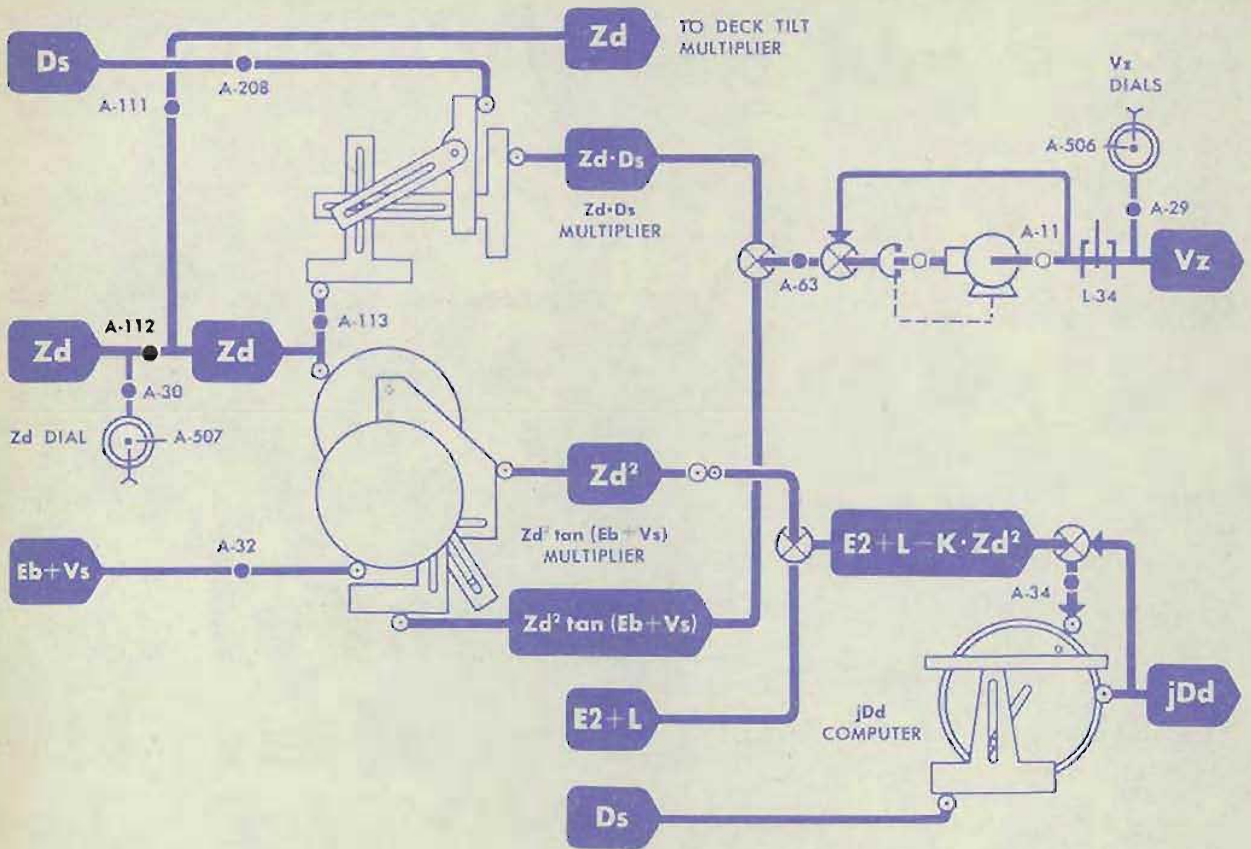
Slip-tighten A-112.

Adjust the position of the Zd^2 cam, by slipping through A-112, until equal positive readings are obtained on the Vz dials when Zd is at 800' or 3200'.

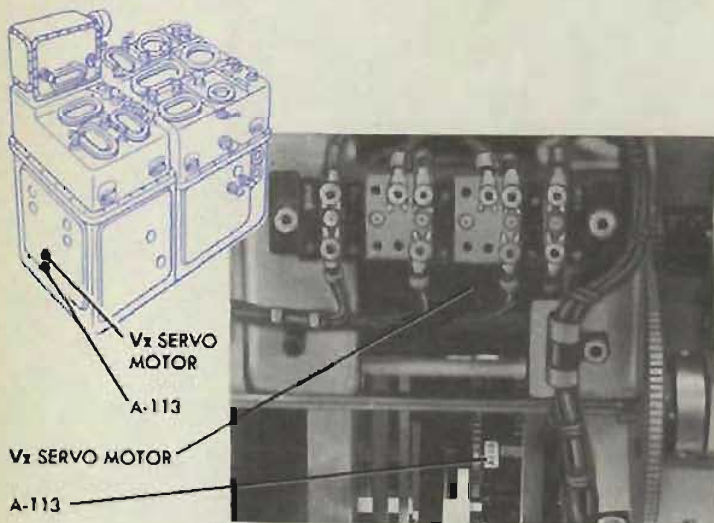
Tighten A-112, and recheck.

Check A-111, A-113, A-63, and A-32.





A-113 $Z_d \cdot D_s$ MULTIPLIER to Z_d DIALS



Location

A-113 is under cover 7. It can be reached through the opening below the V_z servo motor.

Check

Turn the power ON.

Set Z_d at 2000'.

Full travel of D_s should produce no motion of the output rack of the $Z_d \cdot D_s$ multiplier.

Motion of the $Z_d \cdot D_s$ output rack may be observed on the V_z dials.

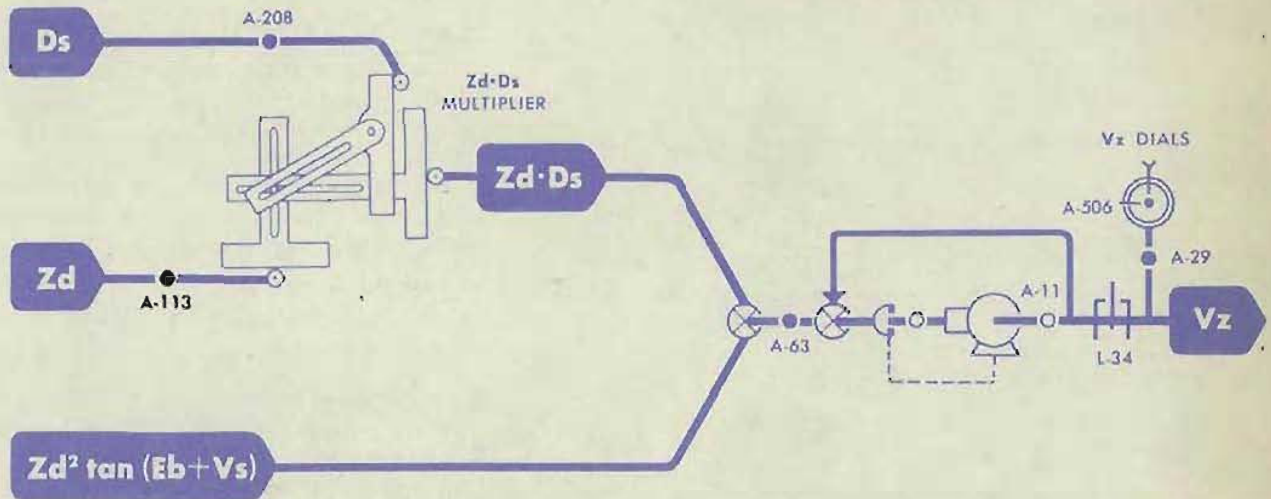
Adjustment

Make A-113 slip-tight.

Adjust the Zd input slide by turning the Zd input shaft until the 0 position is obtained. At the 0 position, the Vz dials show no motion for full travel of the Ds input.

Tighten A-113, and recheck.

Check A-63.



A-114 ASSEMBLY CLAMPS

A-114 is an assembly clamp in a shock absorber assembly on intermittent drive output shafts. It is used on the dRs , cR , $Eb + Vs$, $E2$, Ds , and Vs intermittent drives.

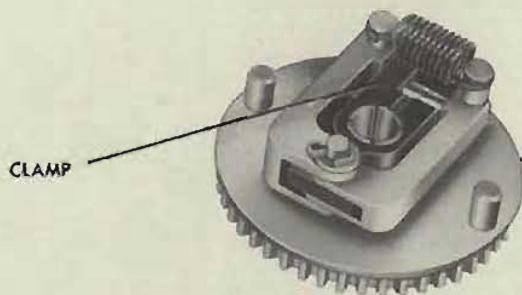
On the E intermittent drive, this assembly clamp is numbered A-251.

On the $R2$ intermittent drive, this assembly clamp is numbered A-255.

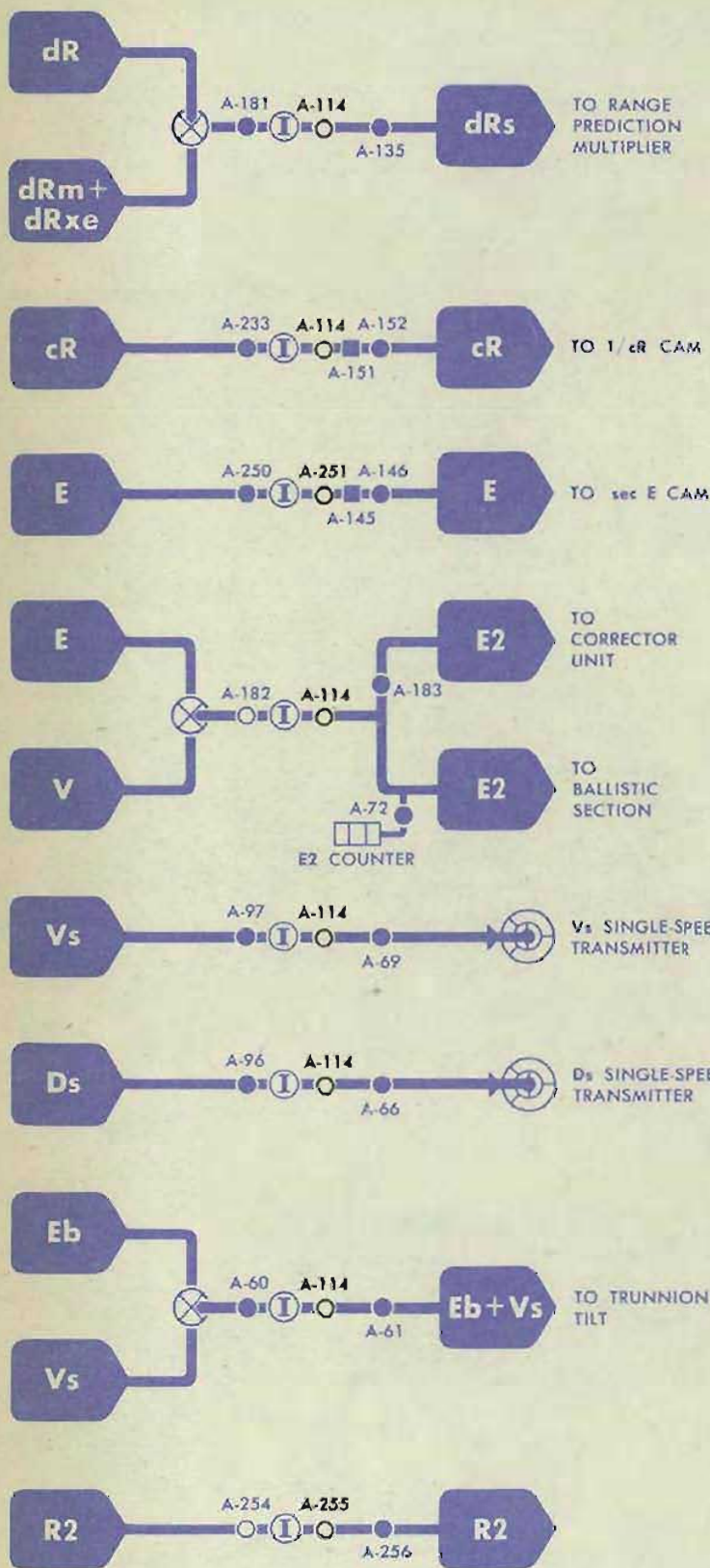
The Ds and Vs intermittent drives are omitted on Mods 1, 3, 4, 8, and 12. The $R2$ intermittent drive is omitted on Mods 0, 1, 2, 3, 4, 6, 7, 9, 10, and 13.

The E intermittent drive is omitted on all mods with Ser. Nos. 389 and lower.

The cR intermittent drive is omitted on Mods 0, 1, 2 and 9.



SHOCK ABSORBER ASSEMBLY



Location

- dRs* —see A-181
- cR* —see A-233
- E* —see A-250
- E2* —see A-182
- Ds* —see A-96
- Vs* —see A-97
- Eb + Vs* —see A-60
- R2* —see A-256

Check

If an intermittent drive output is incorrect, the shock absorber clamp may have slipped. (See *Locating Casualties—Intermittent Drives*, page 552.)

If the output gearing of the intermittent drive can be turned beyond the spring action of the shock absorber when the intermittent drive is in a cut-out position, the shock absorber clamp is slipping.

Adjustment

A-114 on the *dRs* intermittent drive: Tighten A-114 and readjust A-135.

A-114 on the *cR* intermittent drive: Tighten A-114 and readjust A-151.

A-251 on the *E* intermittent drive: Tighten A-251 and readjust A-145.

A-114 on the *E2* intermittent drive: Tighten A-114 and readjust A-72 and A-183.

A-114 on the *Ds* intermittent drive: Tighten A-114 and readjust A-66, or adjust A-114 in accordance with the procedure for A-66.

A-114 on the *Vs* intermittent drive: Tighten A-114 and readjust A-69, or adjust A-114 in accordance with the procedure for A-69.

A-114 on the *Eb + Vs* intermittent drive: Tighten A-114 and readjust A-61.

A-255 on the *R2* intermittent drive: Tighten A-255 and readjust A-256.

A-115 ELEVATION COMPONENT INTEGRATORS to E DIALS

Location

A-115 is under cover 1, at the left side.

Check

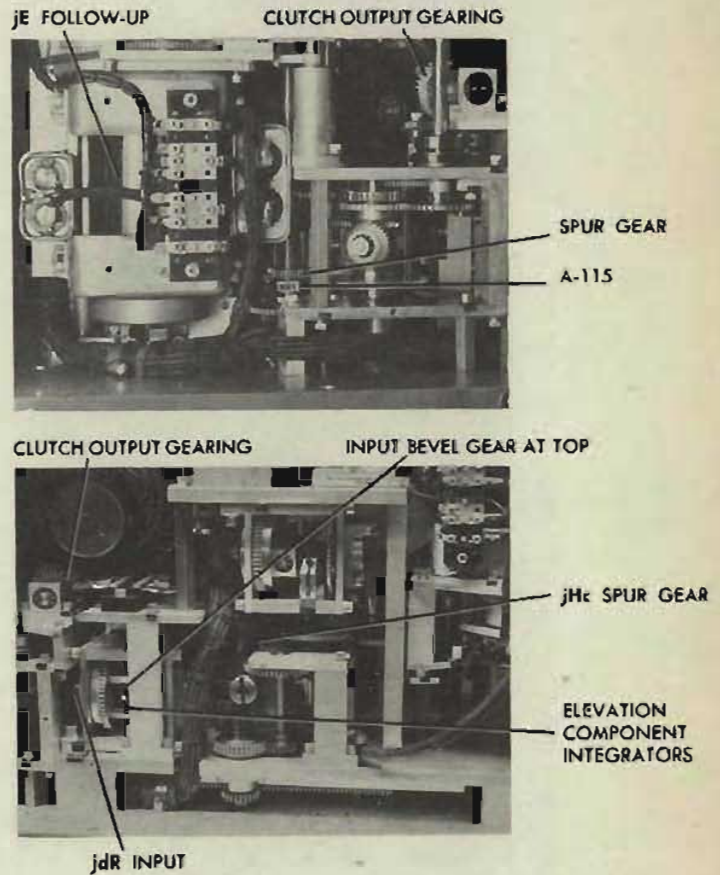
Turn the power OFF.

Set E at 0° .

Turn the jdR input line at the output gearing of the clutch, 1 inch to the rear and above the elevation component integrator.

The jdR input bevel gear of the elevation component integrator should be at the top of the driving roller.

There should be no motion of the jHc output when the jdR line is turned. Any motion of jHc can be checked on the small spur gear in front of the component integrator about 2 inches in and on the right side of the dH input gear hanger.



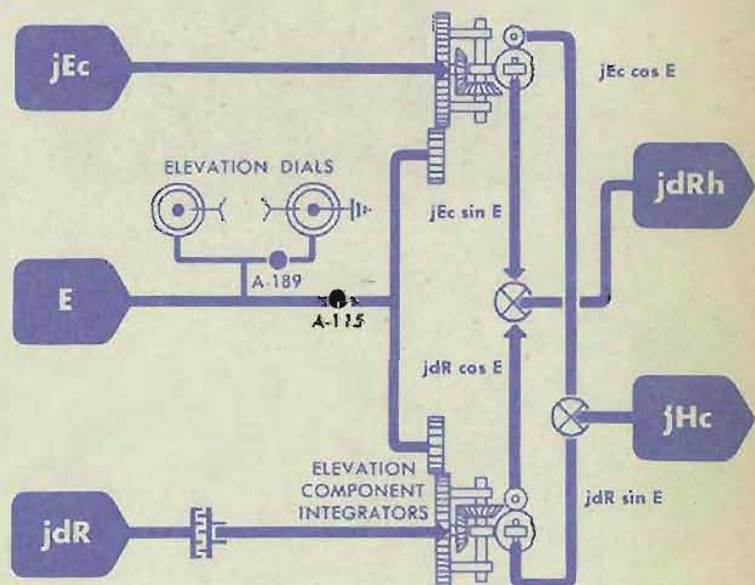
Adjustment

If the bevel gear is not at the top of the driving roller, and if there is any motion of jHc , make A-115 slip-tight.

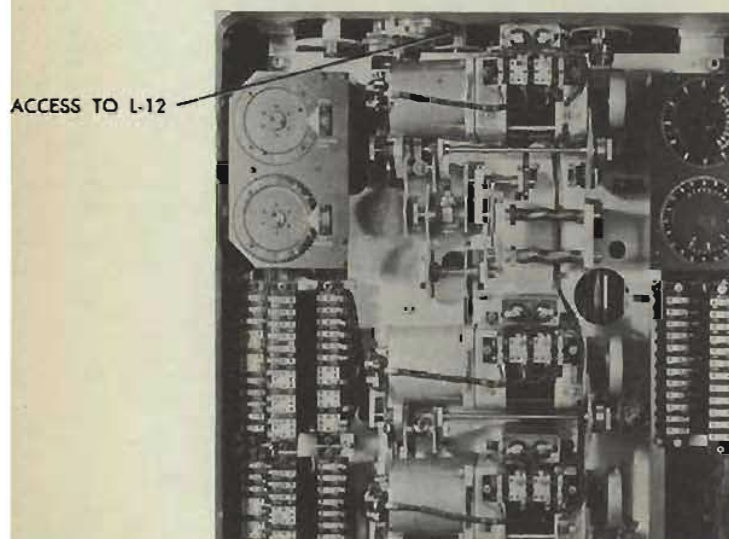
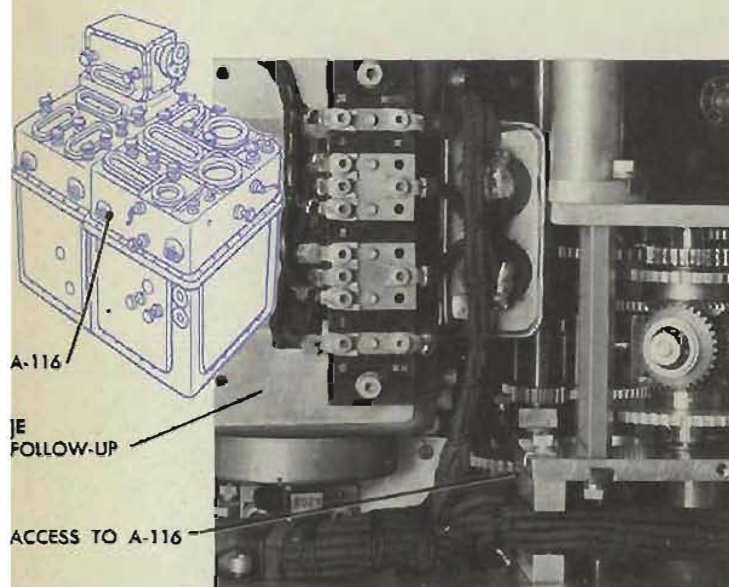
With E at 0° , adjust the small spur gear above the clamp until the input roller of the component integrator is positioned so that there is no motion of jHc when the jdR input line is turned.

The bevel gear must be at the top of the driving roller.

Tighten A-115, and recheck.



A-116 ELEVATION DIALS to L-12



Location

A-116 is under cover 1, at the left side, 3 inches in front of the damper on the *jE* follow-up. L-12 is under cover 7. The shaft is vertical, and only the upper limit is visible.

Check

Turn *E* from limit to limit.

The limit stop should function at -5° and $+85^\circ$ on instruments with Ser. Nos. 389 and lower, and at -25° and $+85^\circ$ on instruments with Ser. Nos. 390 and higher.

NOTE: If either limit cannot be reached, it is possible that A-123, A-124, A-128, A-180, or A-145 is causing a restriction; the restricting clamp should be loosened and readjusted later.

Adjustment

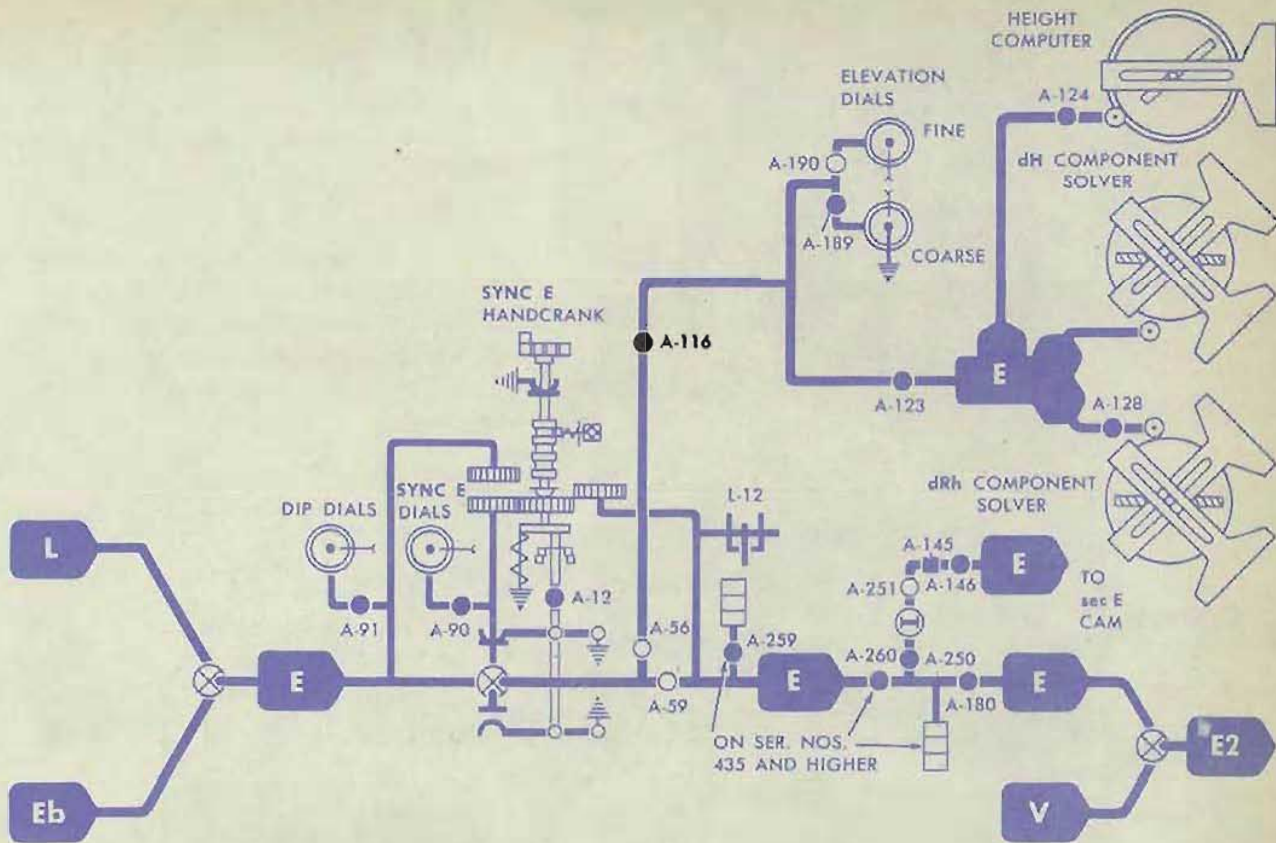
If the *E* dials do not read 85° when L-12 is at its upper limit, make A-116 slip-tight. Bring the *E* dials to 85° by turning the vertical shaft extending from A-116. Tighten A-116 and recheck at the lower limit.

Readjust any clamps loosened.

Check A-250, A-145, A-259, A-260, and A-180.

Note

A-250 is omitted on instruments with Ser. Nos. 389 and lower. A-260 and A-259 are omitted on instruments with Ser. Nos. 434 and lower.



A-117 BEARING COMPONENT INTEGRATORS to B DIAL

Location

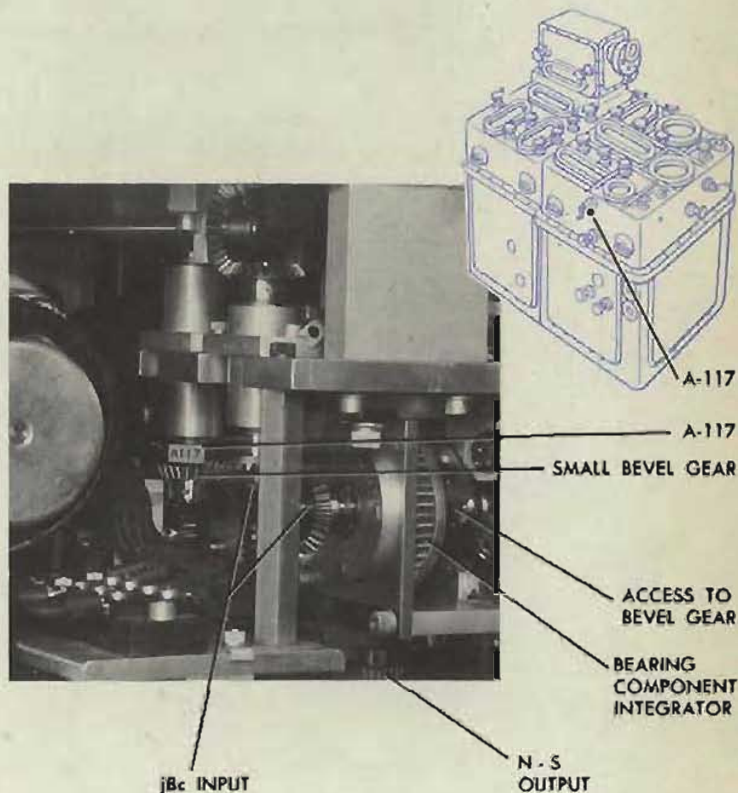
A-117 is under cover 1, at the center of the left side, to the rear of the bearing component integrator.

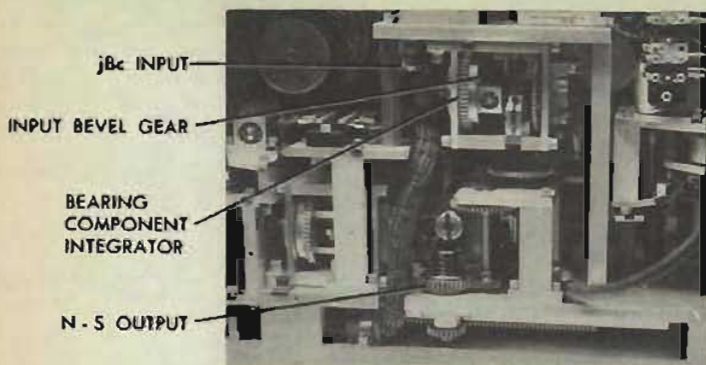
Check

Turn the power OFF.

Set the zero index of the compass ring dial against the fixed index. The *jBc* input bevel gear of the bearing component integrator should be at the right of the driving roller (viewed from the front of the instrument).

Turn the *jBc* input. Watch the spur gear directly below the bearing component integrator to see that there is no N-S output.



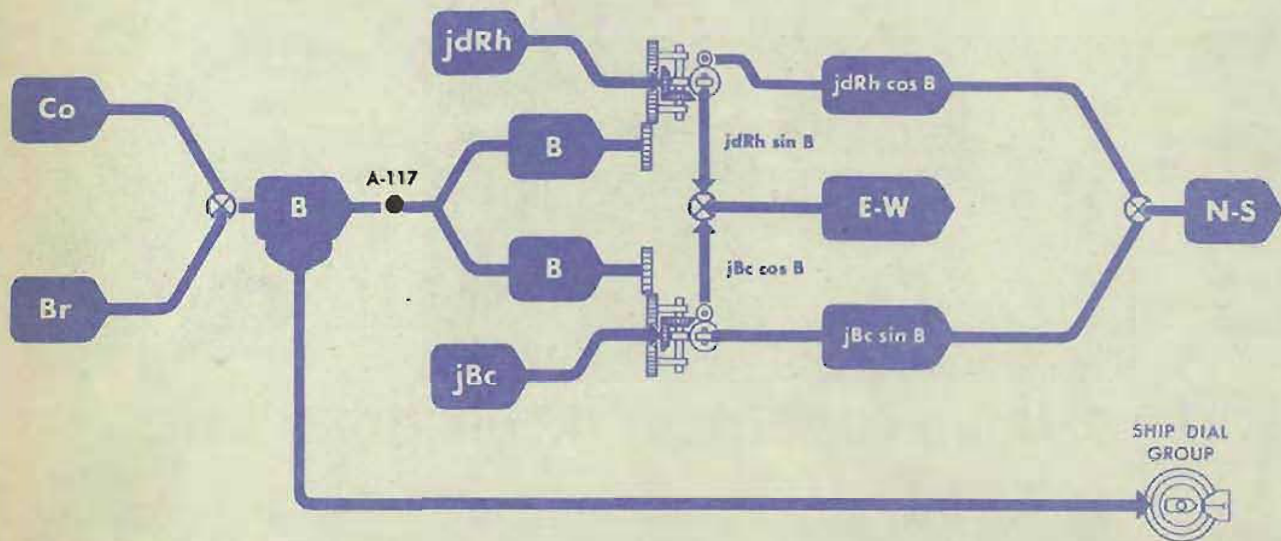


Adjustment

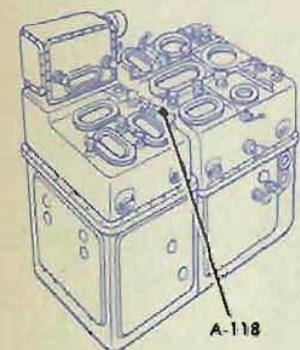
If the bevel gear is not at the right of the driving roller, or if there is any motion of the N-S output, make A-117 slip-tight.

Adjust the small bevel gear below A-117 until the angle gear is positioned so that there is no motion of the N-S output for any input of jBc . The bevel gear must be to the right of the driving roller.

Tighten A-117 and recheck.



A-118 SYNCHRONIZING THE RdE FOLLOW-UP



Location

A-118 is under cover 1, on the input gearing to the RdE follow-up.

L-7 is on the underside of the front top section. It can be seen from the cover 3 opening. The shaft is horizontal, with the upper limit to the rear.

CAUTION

With the power OFF, turn the RdE follow-up manually between limits. If there is any restriction before the limits are reached, A-108, A-134, or A-154 is upset. Determine which adjustment is causing the restriction and loosen the clamp.

Check

Turn the power ON.

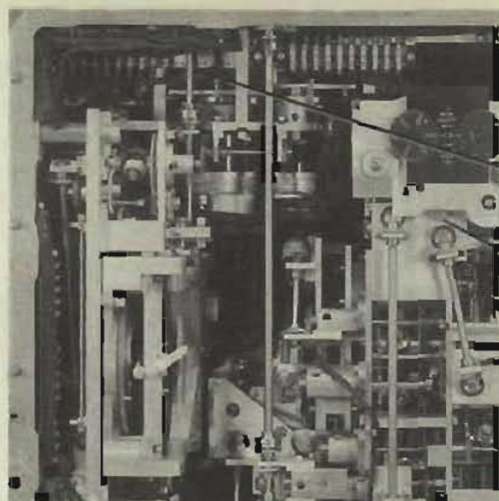
Set *Br* at 90°.

Set *E* at 60°.

Set *So* at 0 knots and *Sh* at 400 knots.

Set *A* at 180°.

Turn *dH* in a decreasing direction until *RdE* reaches the lower limit of L-7. *dH* should read between -107 and -110 knots, and the *RdE* follow-up should be synchronized.



Adjustment

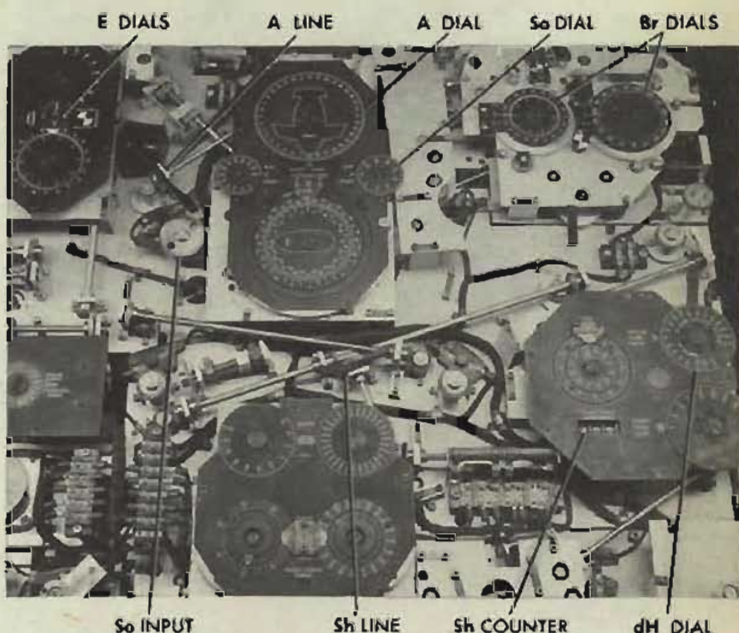
If *dH* does not read correctly when *RdE* is at the lower limit, slip-tighten A-118. Hold *dH* at -108 knots and turn the spur gear above A-118 until the follow-up synchronizes at the lower limit of L-7.

Tighten A-118 and recheck at the upper limit. To check the upper limit, set *A* at 0° and increase *dH* until the upper limit of L-7 is reached. *dH* should read between +107 and +110 knots.

Remove all wedges.

Readjust any clamps loosened, and check A-108, A-154, and A-134.

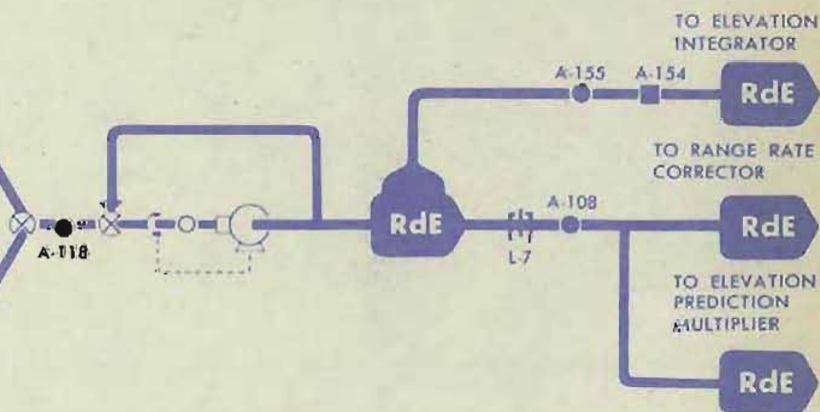
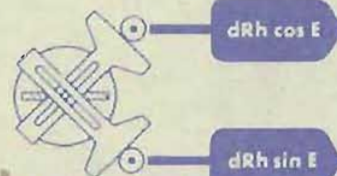
Recheck by running elevation B tests.



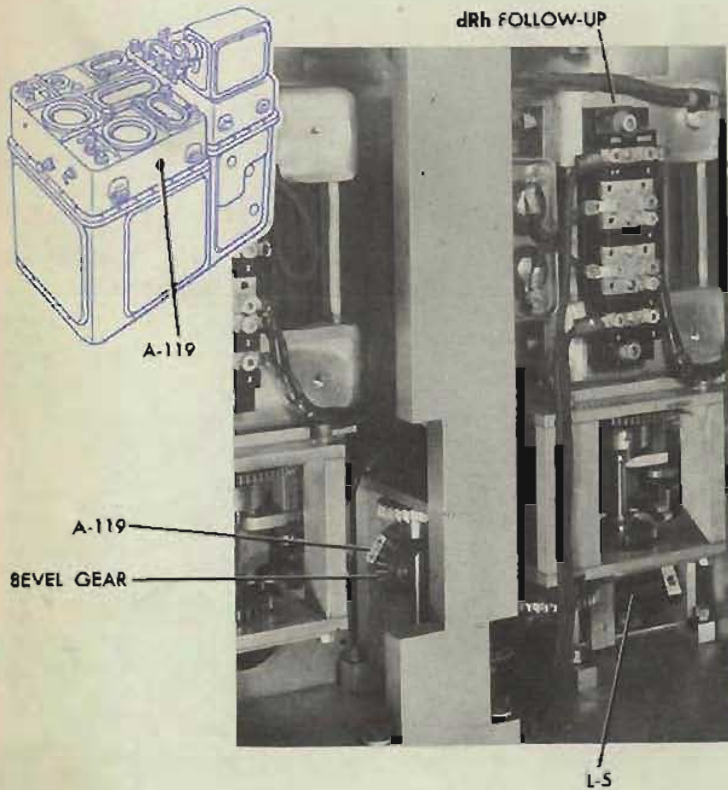
dH COMPONENT SOLVER



dRh COMPONENT SOLVER



A-119 SYNCHRONIZING THE dRh FOLLOW-UP



Location

A-119 is under cover 1, on the *dRh* follow-up input gearing.

L-5 is below the *dRh* follow-up. Its lower limit is toward the rear.

CAUTION

Turn the *dRh* output from limit to limit manually before turning on the power, to make sure both limits can be reached. If they cannot be reached, loosen A-125.

Check

Remove the KRR lead on the target angle push-button switch.

Turn the power ON.

Set *Br* and *A* at 0° and wedge the lines.

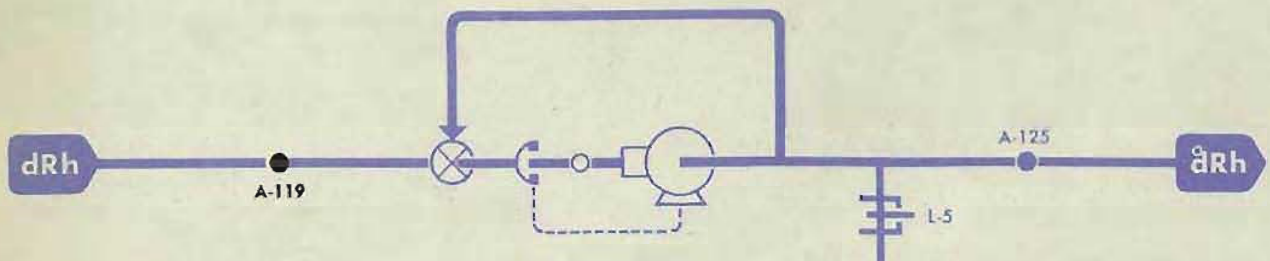
Set *Sh* at 400 knots and wedge the line.

Set *So* at 0 knots.

Increase *So* to 40 knots. The *dRh* follow-up should be synchronized at the lower limit of the stop just as *So* reaches 40 knots.

Turn *Br* and *A* to 180° and wedge the lines.

Increase *So* to 40 knots. The *dRh* follow-up should be synchronized at the upper limit of the stop just as *So* reaches 40 knots.



Adjustment

If the follow-up is not synchronized at the proper positions, slip-tighten A-119.

Check that *A* and *Br* are at 180° , and *So* is at 40 knots.

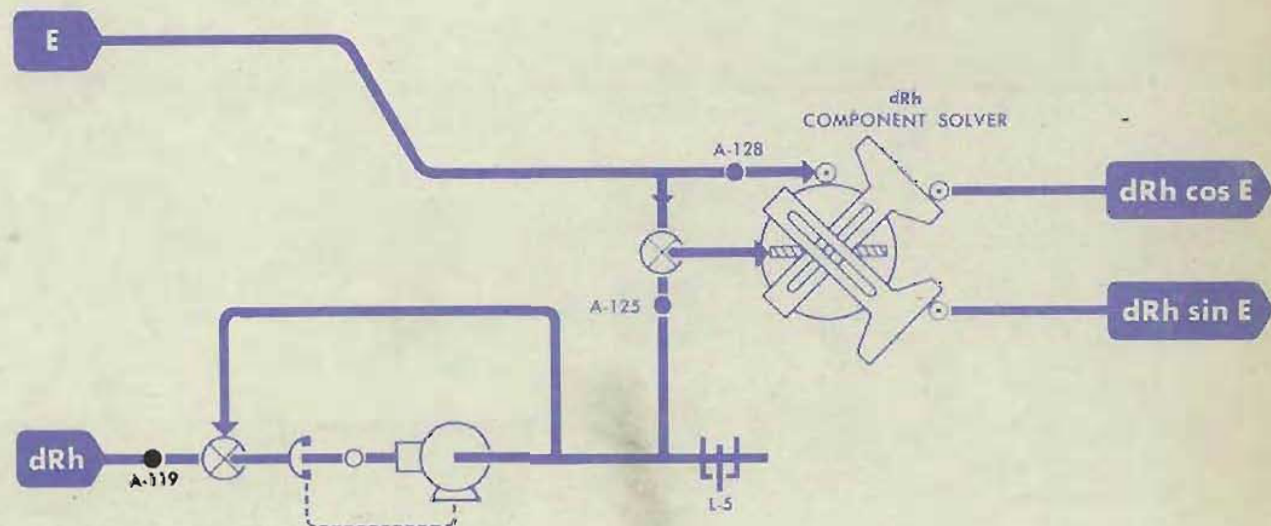
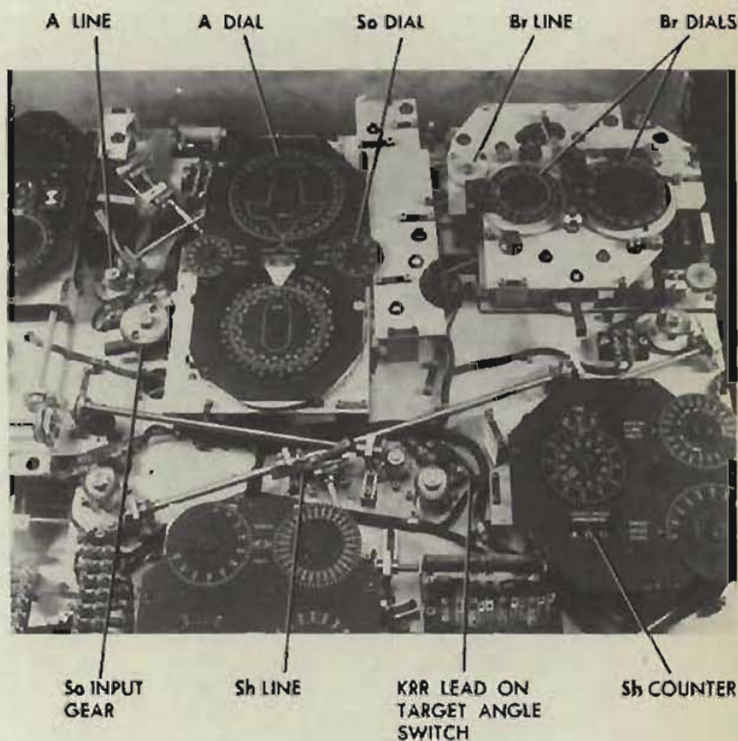
Turn the bevel gear on which A-119 is located until the follow-up synchronizes at the upper limit of the stop.

Tighten A-119. Set *Br* and *A* at 0° . Increase *So* to 40 knots and check to see that the follow-up is synchronized at the lower limit.

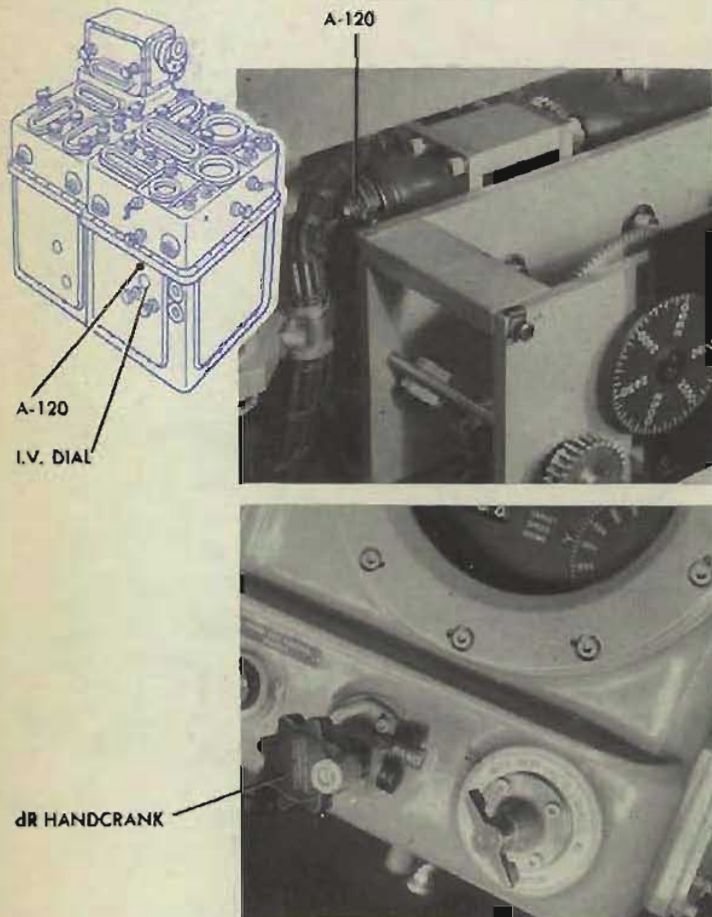
Split any overtravel.

Check A-125.

Remove all wedges and replace the KRR lead.



A-120 I.V. HOLDING FRICTION



Location

A-120 is under cover 3, behind the I.V. dial.

Check

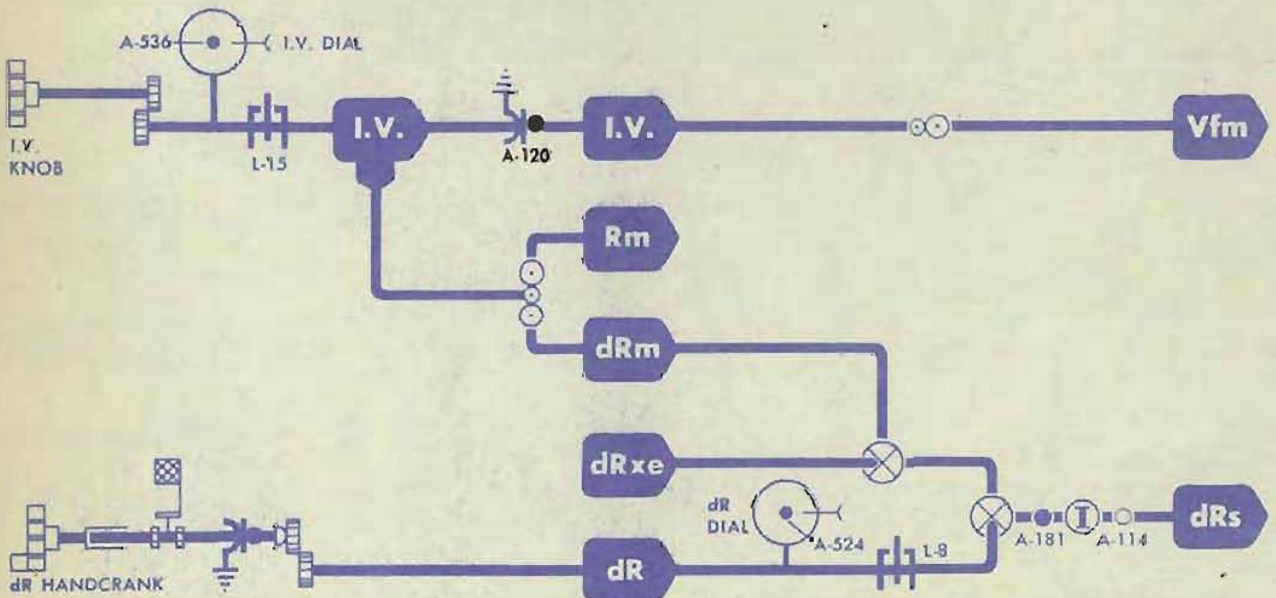
This friction should hold the I.V. setting without too much drag on the line.

Check the friction setting by turning dR.

Adjustment

If any motion backs through the I.V. input gear, loosen A-120 and turn it until there is sufficient friction to hold the I.V. setting.

Tighten A-120 and recheck.



A-121 SYNCHRONIZING THE RdBs FOLLOW-UP

Location

A-121 is under cover 1, in front of the *RdBs* follow-up.

L-6 is under cover 5, above the *Dtwj* follow-up. Its upper limit is toward the center of the instrument.

Check

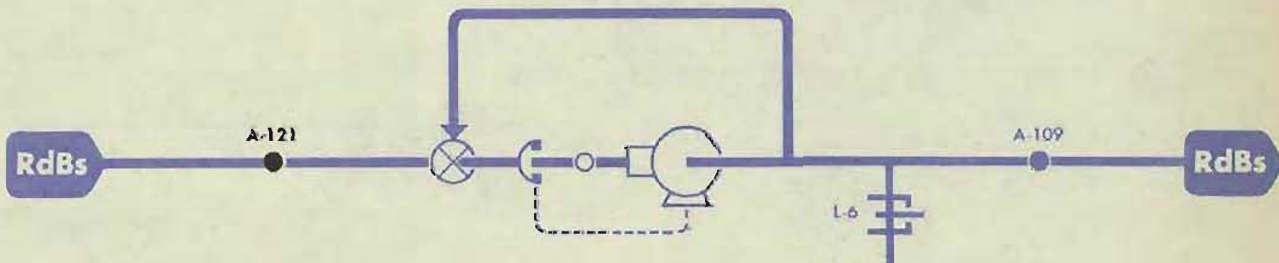
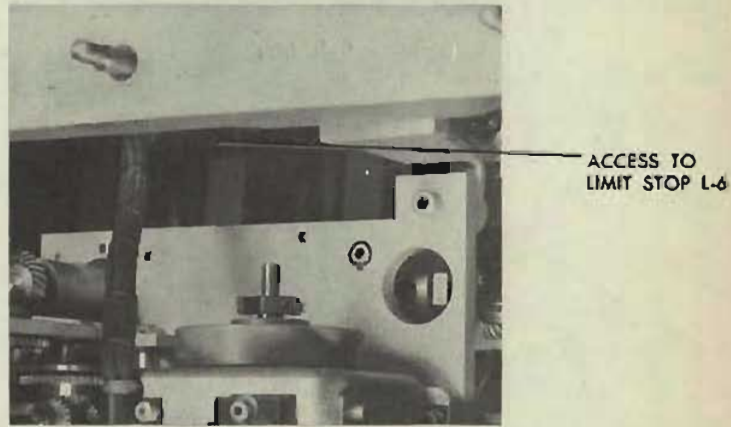
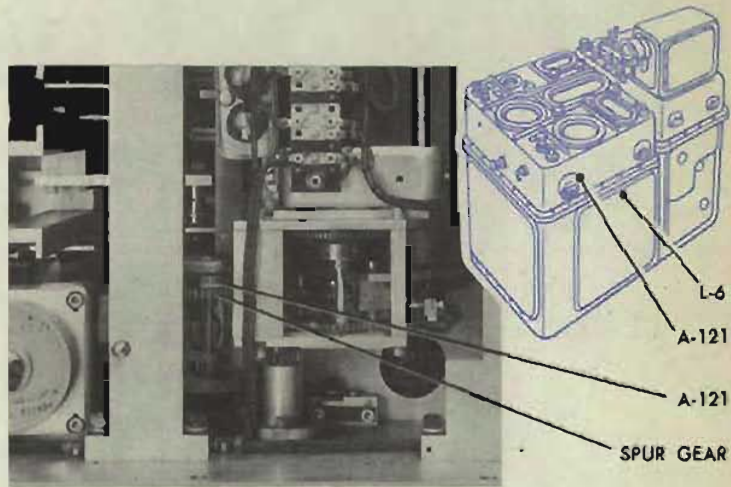
CAUTION: Turn the power OFF. Turn the *RdBs* follow-up output between limits manually to make sure there is no restriction within the limits of the stop. If either limit cannot be reached, loosen A-109.

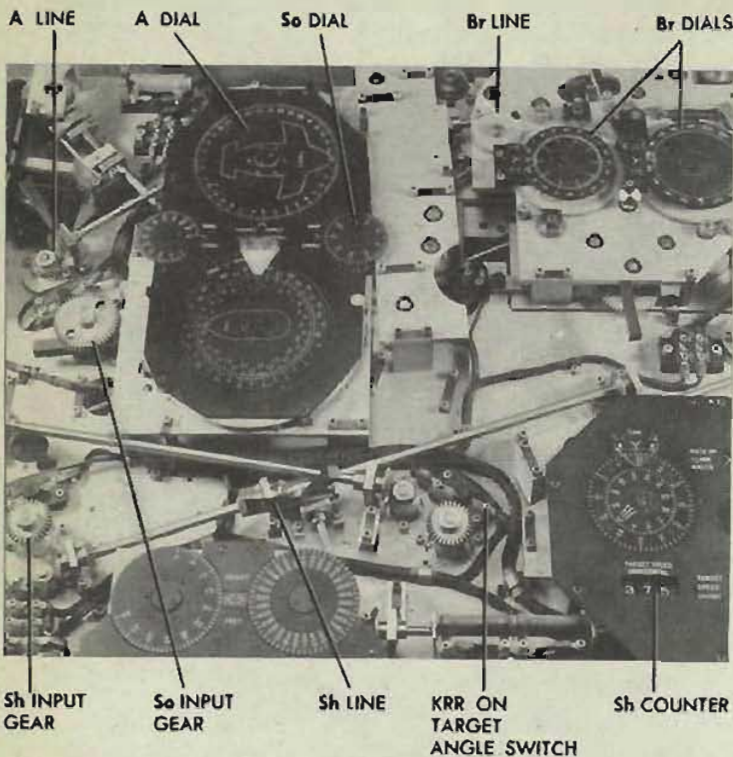
Turn the power ON.

Remove the KRR lead on the target angle push-button switch. Set *Br* at 90° and wedge the line.

Set *A* at 90°, and *Sh* at 375 knots and wedge the lines.

Increase *So* to 25 knots. The *RdBs* follow-up should be synchronized at the upper end of the limit stop just as *So* reaches 25 knots on the dial.





Set *A* and *Br* at 270°. Increase *So* to 25 knots. The *RdBs* follow-up should be synchronized at the lower end of the limit stop as *So* reaches 25 knots. Any overtravel should be split.

Adjustment

If the follow-up does not synchronize at the proper *So* value, slip-tighten A-121.

Set *A* and *Br* at 90°, and *So* at 25 knots.

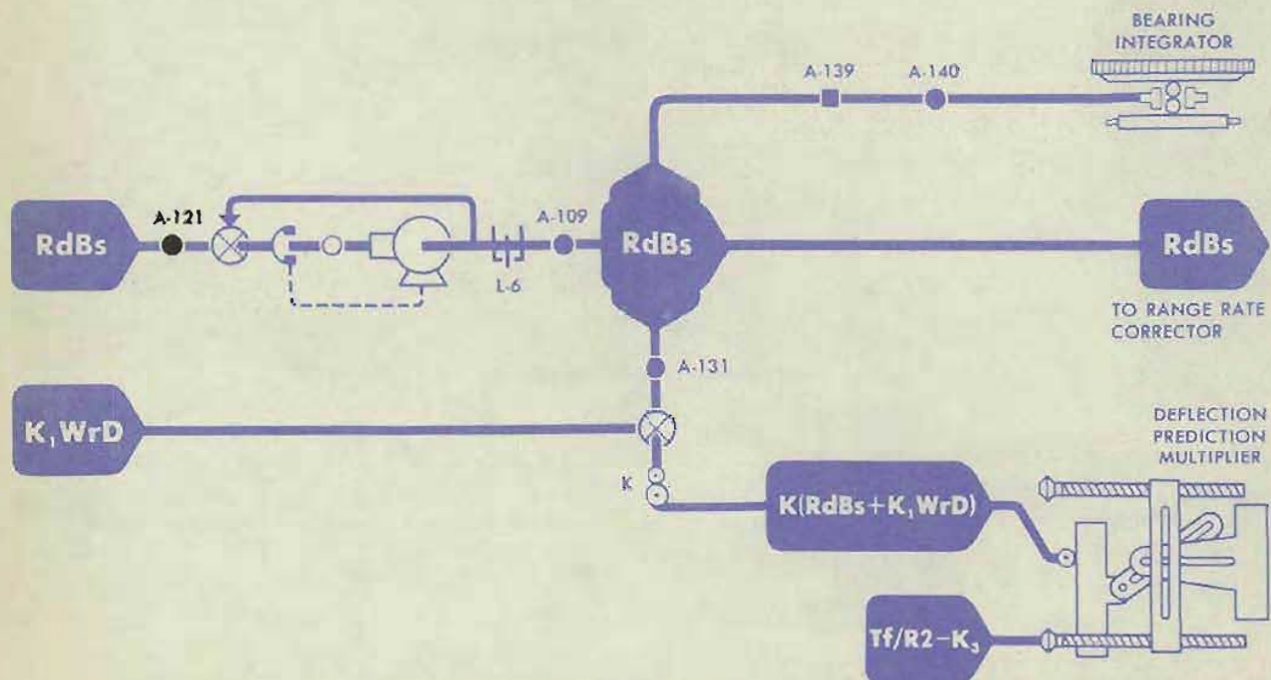
Turn the spur gear below A-121 until the follow-up is synchronized at the upper limit.

Tighten A-121. Set *Br* and *A* at 270° and recheck to see that the follow-up is synchronized at the lower limit.

Split any overtravel.

Remove all wedges and replace the KRR lead.

Check A-109, and run the bearing B tests.



A-122 So HOLDING FRICTION

Location

A-122 is located under cover 1, behind the *RdB*s follow-up.

Check

This friction should hold the *So* setting without too much drag on the line.

Set *So* at 40 knots.

Turn the power ON.

Turn *Br* through 90°.

No motion of *Br* should back through the *So* line to turn the *So* dial.

Adjustment

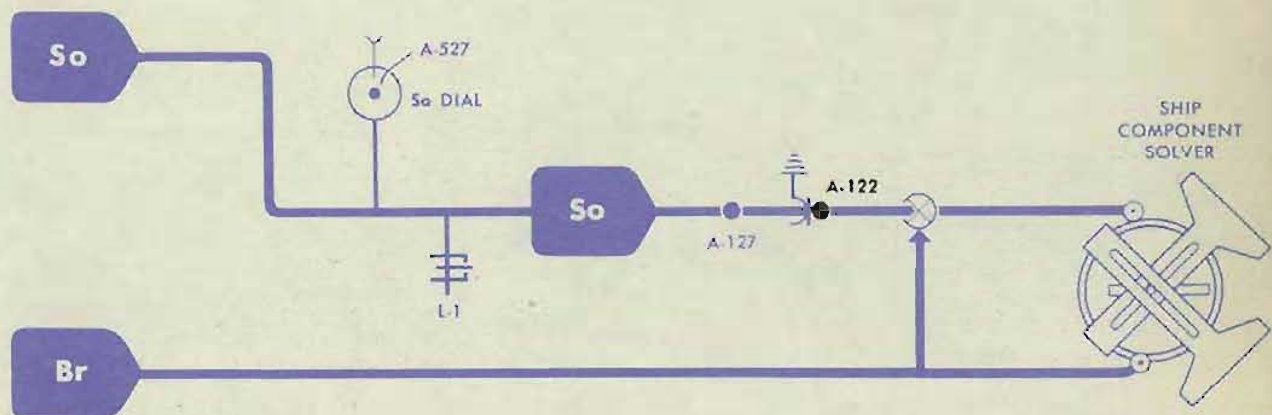
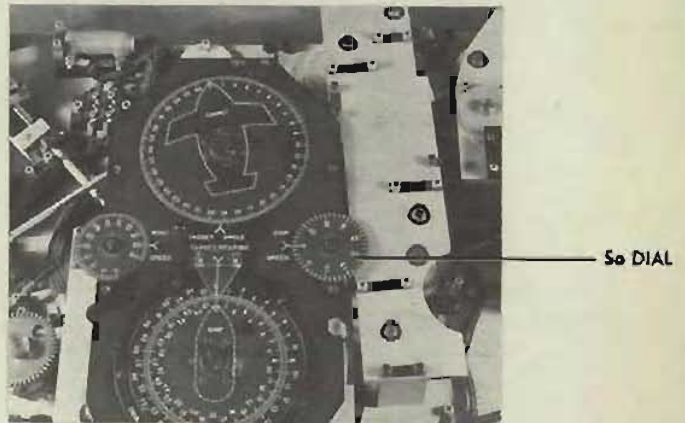
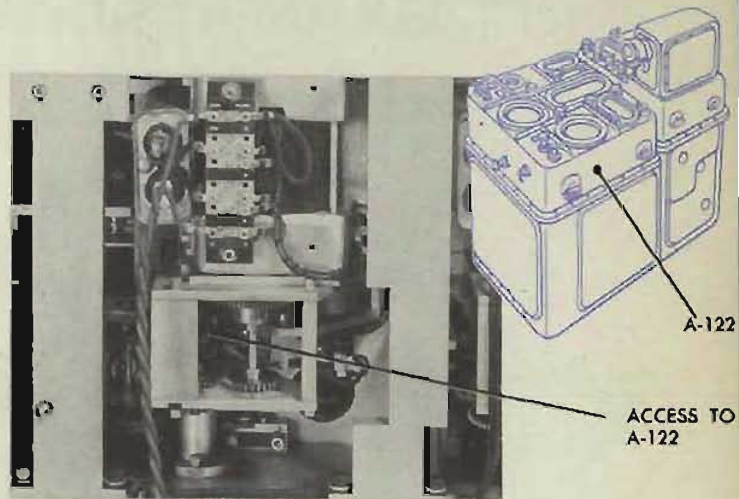
Turn the power OFF.

If any motion backs through *So*, loosen A-122.

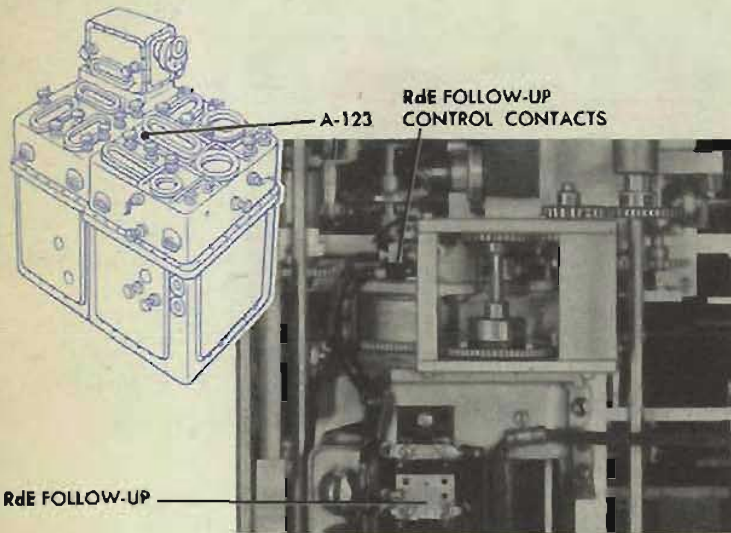
Turn the clamp clockwise to increase the friction.

Tighten A-122, and recheck.

NOTE: If the *So* holding friction is adjusted excessively tight, the *So* receiver motor will not function. To check for this condition, make the synchronizing test of the *So* receiver. See page 62.



A-123 dH COMPONENT SOLVER to E DIALS



Location

A-123 is under cover 1, to the right of the *RdE* follow-up contacts. It is the upper clamp on a short vertical shaft.

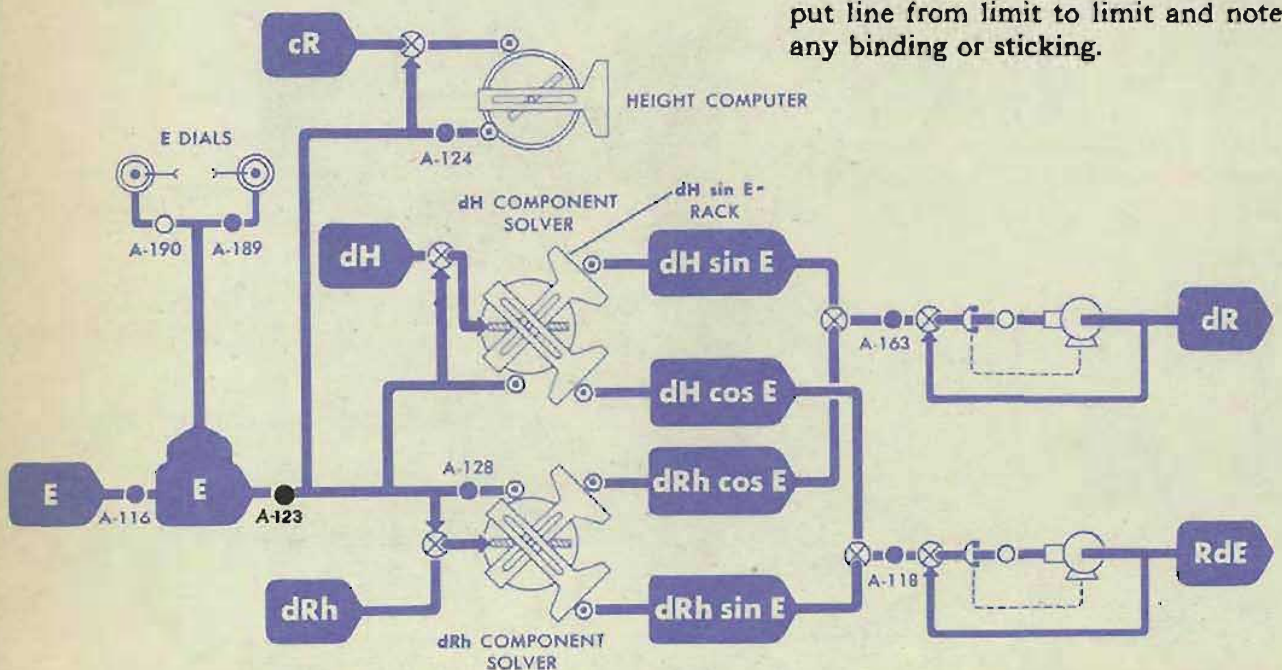
Note

A-123 can be reached with a long screw driver through the back top section.

Possible damage

If A-123 is upset, the *dH* component solver vector gear may have been run beyond its limit with such force that the hangers, gears, and shafts of the lead screw input line may have been damaged.

To check for damage, turn the *dH* input line from limit to limit and note any binding or sticking.



Check

Set E at 0° .

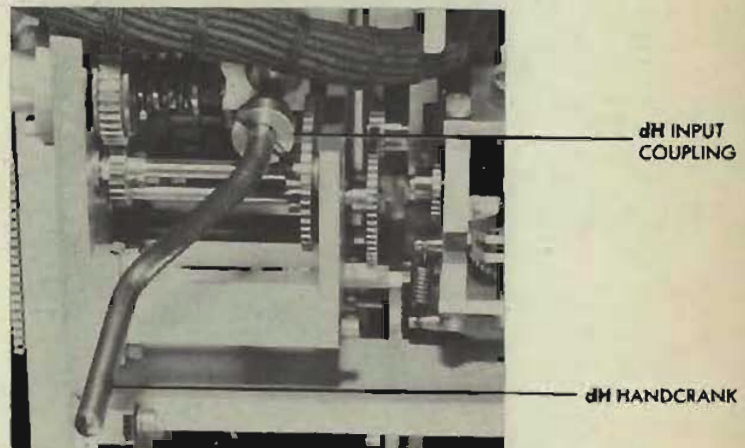
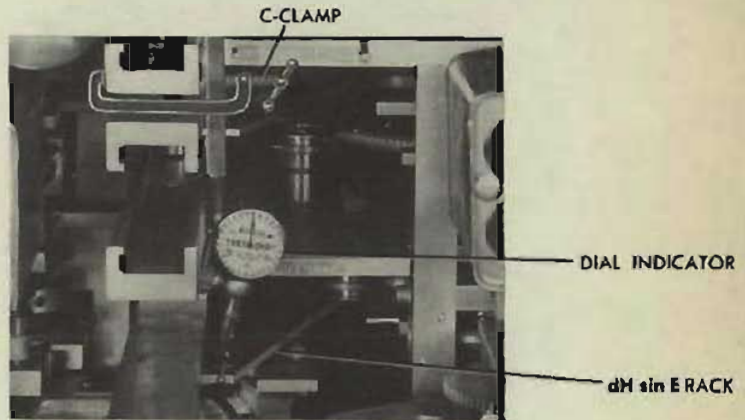
The spur gear on the lead screw of the dH component solver vector gear should be toward the front. The dH component solver is the fourth solver from the top, and can be seen through the access at the front of the RdB s follow-up.

Set dH at 0 knots.

Set up a dial indicator on the $dH \sin E$ rack.

Run dH from 0 knots to DIVE 250.

The output rack movement should not exceed 0.002 inch on the indicator. Make sure that E is at 0° .



Adjustment

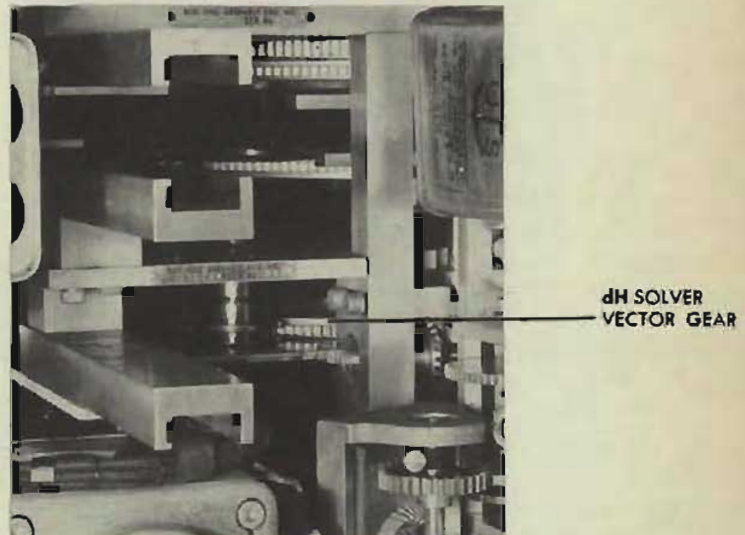
If the indicator shows more than 0.002-inch motion, slip-tighten A-123.

Correct all the way by turning the dH vector gear with a gear pusher.

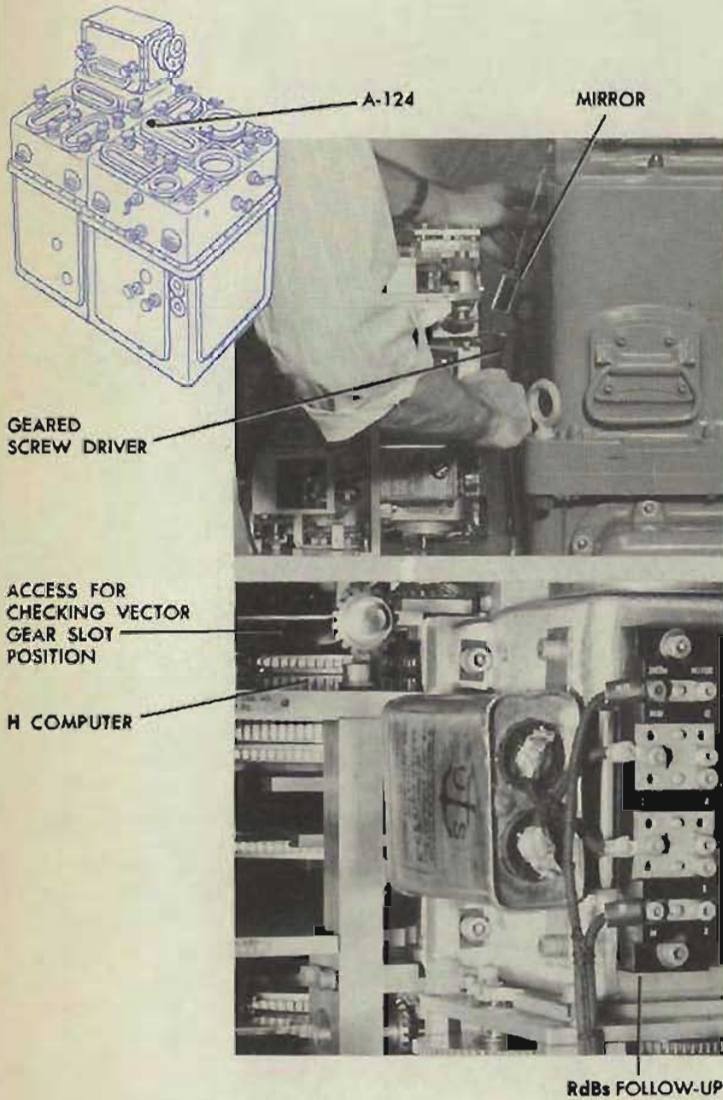
Tighten A-123 and recheck, by running dH from DIVE 250 to CLIMB 150.

Remove the indicator.

Check A-124, A-128, A-118, A-163.



A-124 HEIGHT COMPUTER to E DIALS



Location

A-124 is under cover 1, to the right of the *RdE* follow-up contacts.

Note

A-124 can be reached with a geared screw driver.

Check

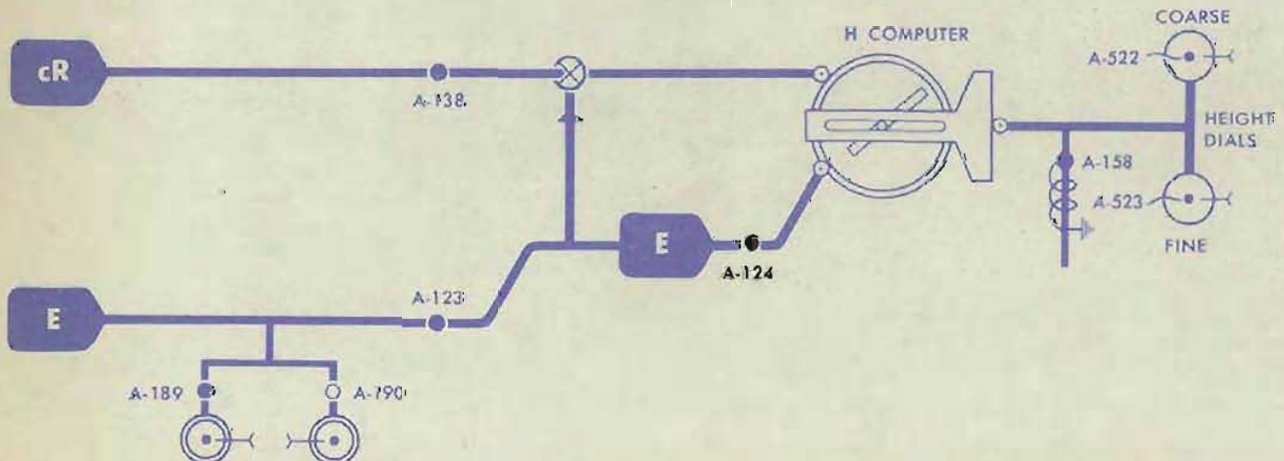
Set *E* at 0°.

The *H* computer vector gear slot should be at the front. The slot can be seen through the access at the right of the front top section. The *H* computer is the top unit of the solver group.

Use the *H* dial as an indicator. Turn *cR* from 0 to its upper limit. The *H* dials should not move.

Adjustment

If the dials move, slip-tighten A-124. Use a gear pusher to move the vector gear to a position at which full travel of *cR* causes no motion on the *H* dials. Tighten A-124, and recheck. Check A-522 and A-523. Readjust A-138.



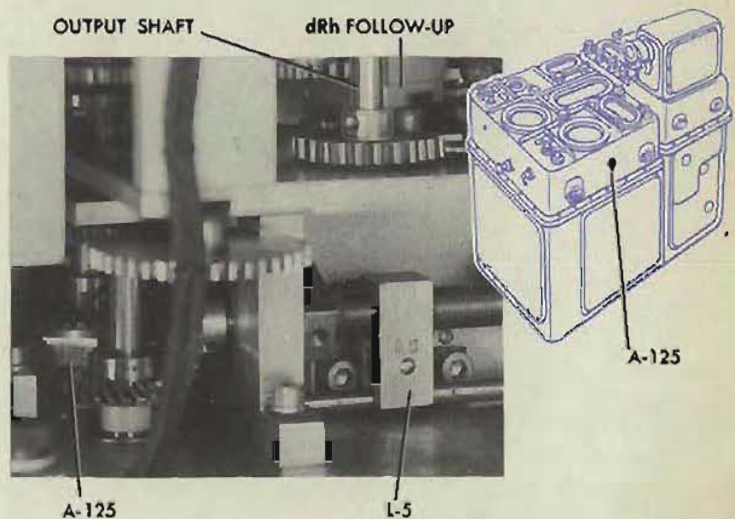
A-125 dRh COMPONENT SOLVER to dRh LINE

Location

A-125 is under cover 1, below the dRh follow-up, to the front of limit stop L-5.

Possible damage

If A-125 is upset, the traveling nut of the dRh component solver may have jammed at one end of the lead screw in the vector gear. Turn the output shaft of the dRh follow-up to move the lead screw. Note any binding or sticking.



Check

Remove the KRR lead from the target angle switch.

Turn the power ON.

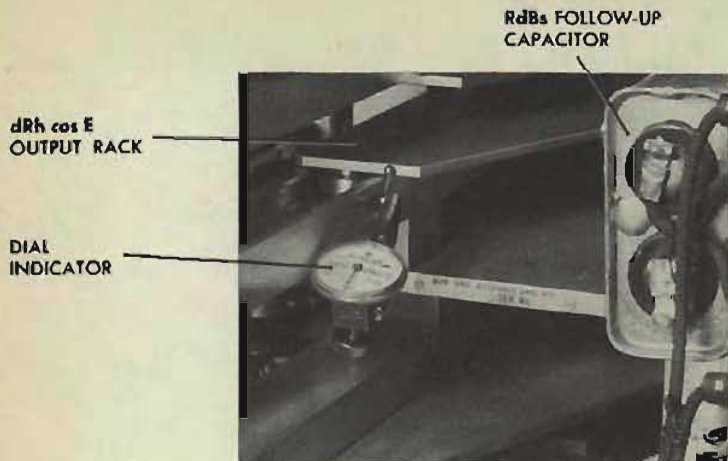
Set A at 90° , B_r at 90° , S_o and S_h at 0 knots, and wedge the lines.

Set E at 85° .

The dRh component solver is the third solver from the top. It can be seen through the access hole on the right side of the front top section in front of the $RdBs$ follow-up. Set up a dial indicator against the $dRh \cos E$ output rack.

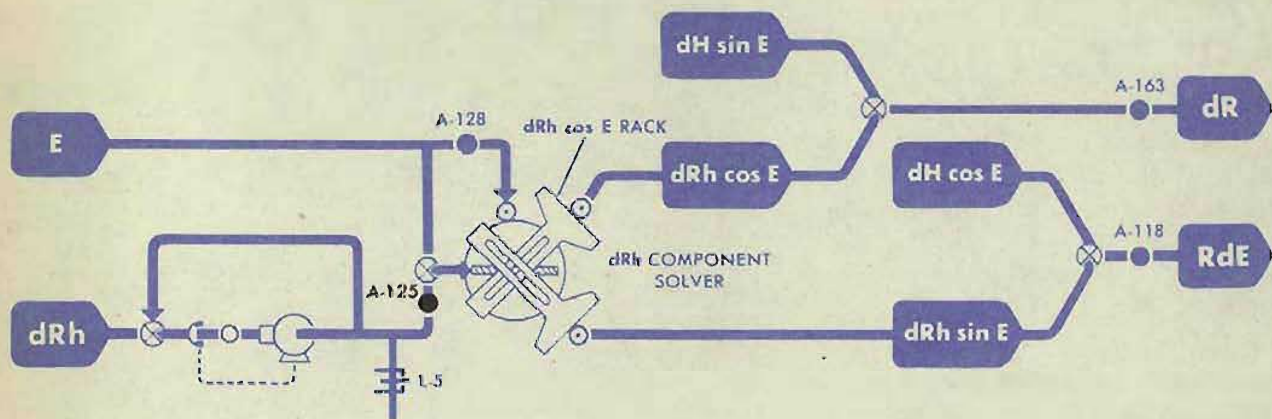
Turn E from 85° to 0° .

The $dRh \cos E$ rack should not move more than 0.002 inch, as read on the indicator dial.

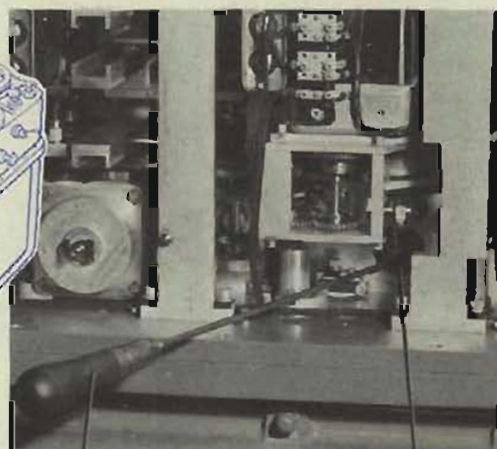
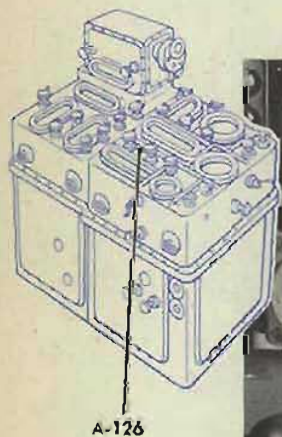


Adjustment

If the indicator moves more than 0.002 inch, slip-tighten A-125. Correct all the way by turning the bevel gear on which A-125 is located. Tighten A-125 and recheck. Readjust until the indicator movement is less than 0.002 inch. Remove all wedges. Replace the KRR lead. Check A-118 and A-163.



A-126 dH COMPONENT SOLVER to dH DIAL



SCREW DRIVER INSERTED IN A-126

A-126 ACCESS HOLE

Location

A-126 is under cover 1. It can be seen near the base plate of the control unit at the center rear just above a spur gear. It is accessible through a hole below the RdBs follow-up.

Possible damage

If A-126 is loose or upset, the lead screw of the dH component solver may be jammed at the end of its travel. Turn the dH line through its full travel. Note any sticking or binding.

Check

Set dH at 0 knots.

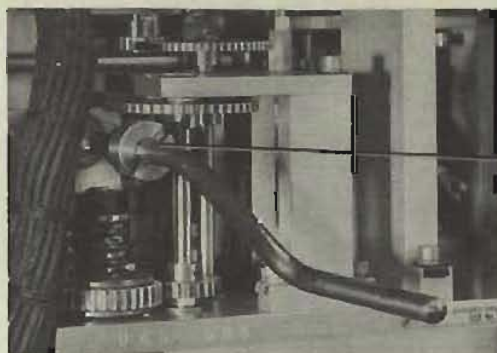
Set E at 0° .

Set up a dial indicator against the $dH \sin E$ output rack.

The dH component solver is the fourth component solver from the top in the solver group. It can be seen by looking through the access in front of the RdB s follow-up.

Turn E from 0° to 85° .

The indicator should register no more than 0.002-inch movement of the rack.



dH HANDCRANK
INSERTED IN dH
INPUT COUPLING

Adjustment

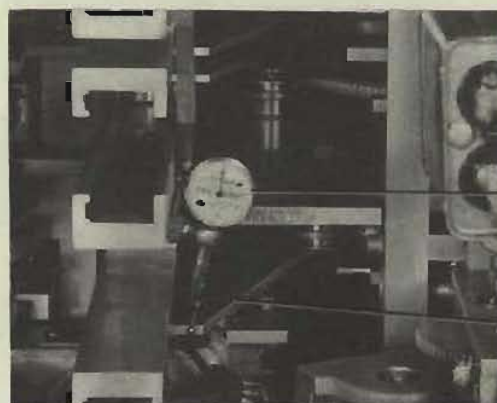
If the indicator shows more than 0.002-inch motion, slip-tighten A-126.

Use a gear pusher and correct all the way by turning the spur gear immediately below A-126. The dH dial must not move off the zero position.

Tighten A-126, and recheck.

Remove the dial indicator.

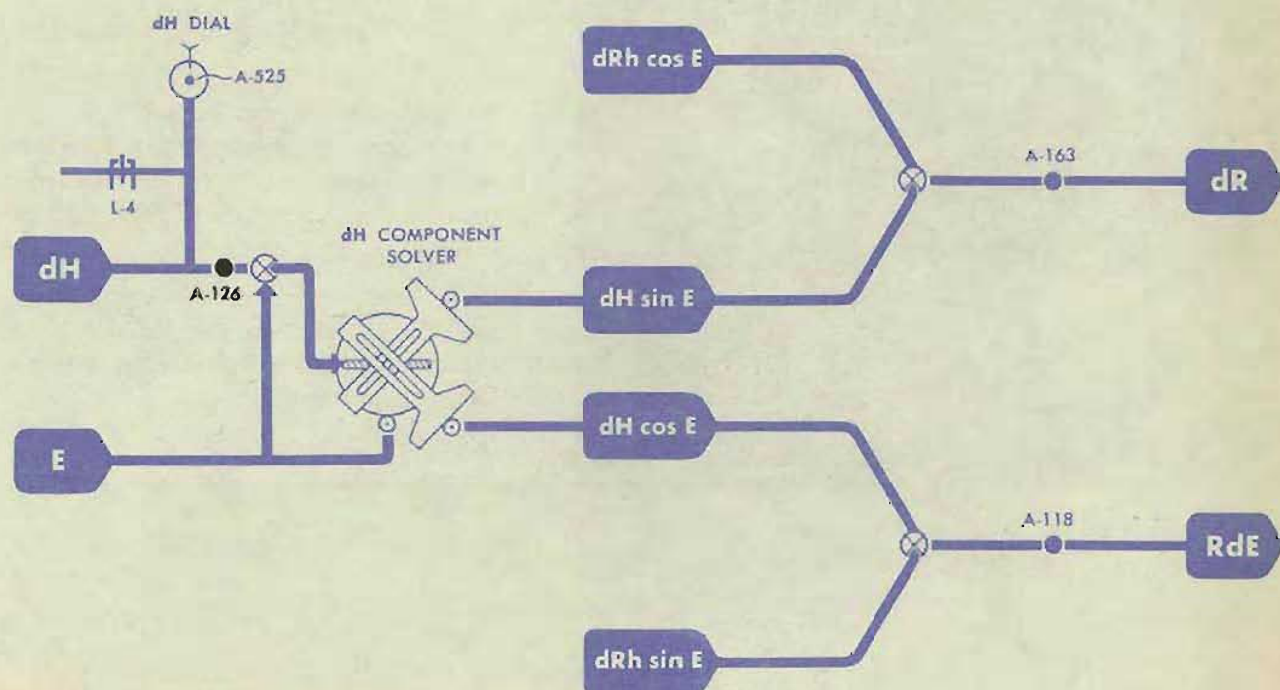
Check A-118 and A-163.



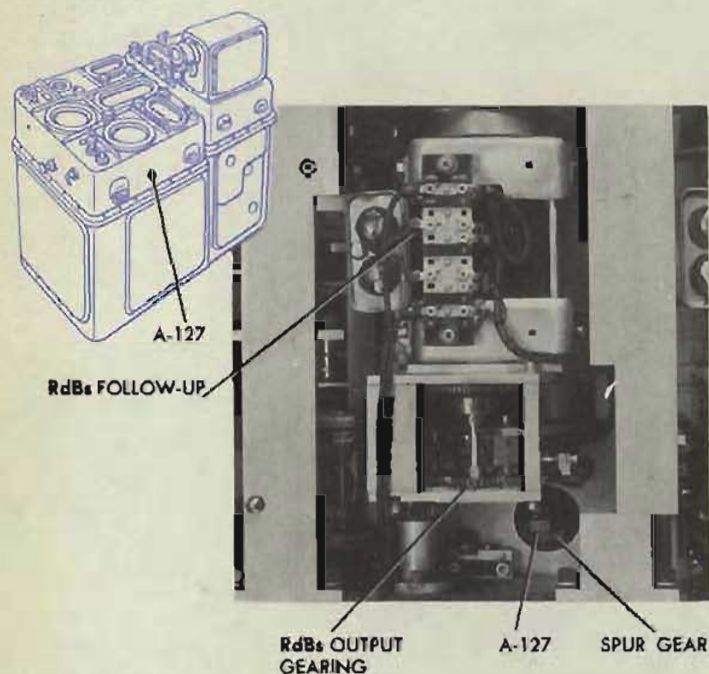
RdB s FOLLOW-UP

DIAL INDICATOR

$dH \sin E$ OUTPUT
RACK



A-127 SHIP COMPONENT SOLVER to So DIAL

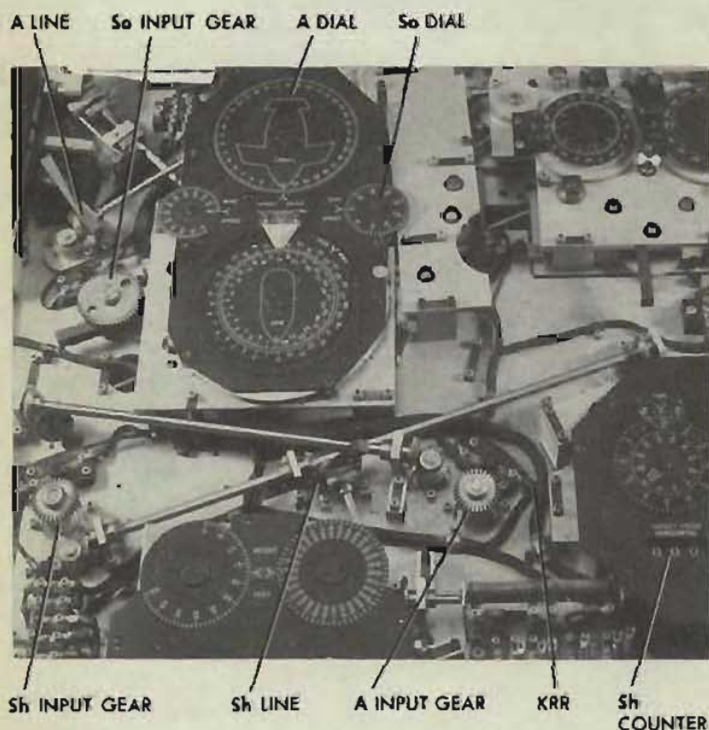


Location

A-127 is under cover 1, below the *RdBs* follow-up.

Possible damage

If A-127 is upset, the cam-follower pin or the cam groove of the ship component solver may be damaged. Check for obstructions by running *So* between its limits.



Check

Turn the power ON.

Set the *So* dial at 0 knots and wedge the *So* input gear.

Set *A* and *Sh* at 0 and wedge the lines. Set *Br* at 90° .

NOTE: Disconnect lead KRR from the target angle push-button switch to prevent the *A* and *Sh* follow-ups from driving these quantities off their zero settings.

The target component solver outputs are now at zero, and the *RdBs* follow-up will indicate only the output of the ship component solver.

Mark the *RdBs* follow-up output gear for use as an indicator. Turn *Br* from 90° to 270° . The follow-up indicator marks should remain matched.

Adjustment

If the marks do not remain matched, slip-tighten A-127. Turn the spur gear below the clamp until the marked output gear is halfway back to its original position.

Tighten A-127.

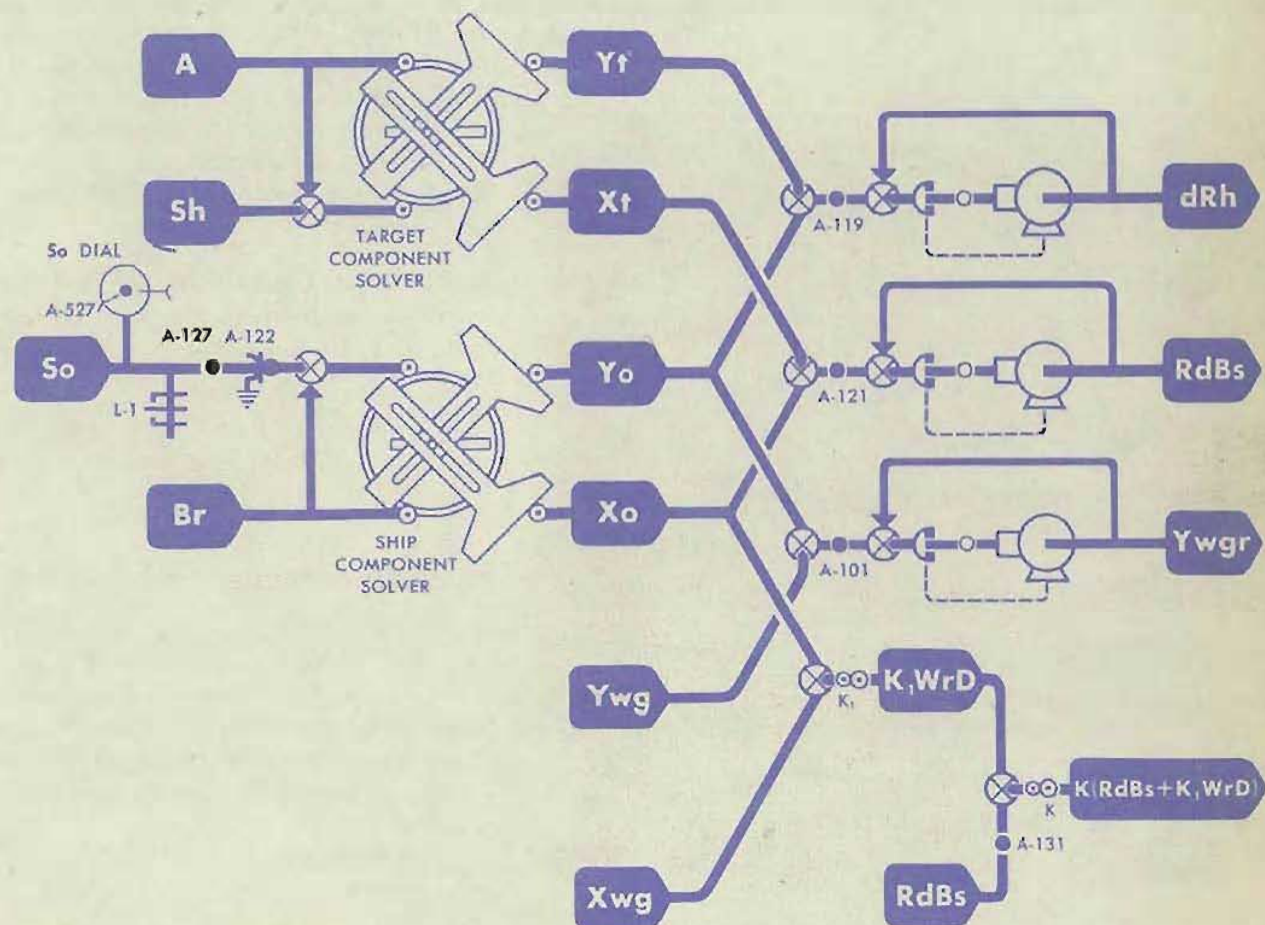
Recheck

Remove the old indicator marks and make new marks with *Br* at 90°. Turn *Br* to 270°. Check the movement of the marks. The error, if any, should be less than half-a-tooth movement of the follow-up output gear. Check that *So* can be increased to 45 knots.

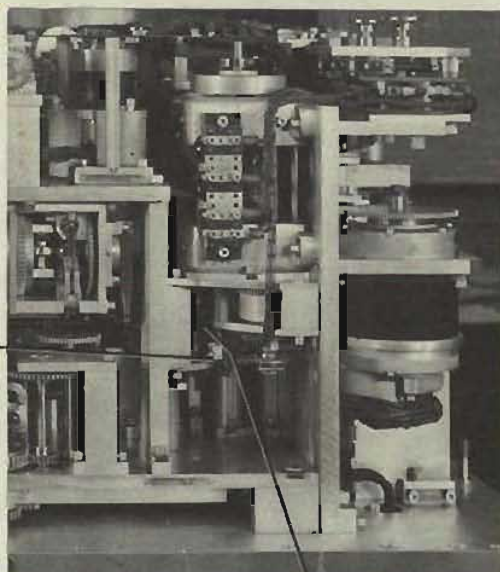
Remove all wedges.

Replace the KRR lead.

Check A-121, A-119, A-101, and A-131.

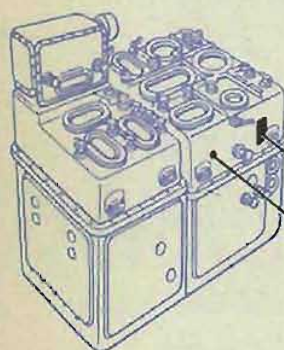


A-128 dRh COMPONENT SOLVER to E DIALS



Sh
FOLLOW-UP
CONTACTS

ACCESS TO A-128



Sh FOLLOW-UP

VIEW OF A-128

IMPORTANT

Before this readjustment is made, check and readjust A-123. When A-123 is correct, the E line, up to A-128, will be correct.

Location

A-128 is located under cover 1, at the right rear.

Note

A-128 can be seen from the left side of the computer. Set dH on 0 knots. Turn the power OFF. Insert a pencil light through the hole to the right of the RdE follow-up. Look into the mechanism near D-25 in front of the jE follow-up.

A-128 can be reached with a long screw driver from the left side of the computer. Be sure that the power is OFF. Insert the screw driver at an angle over the Sh contacts to reach A-128.

Possible damage

If A-128 is upset, the vector gear in the dRh component solver may have been run beyond its limit with such force that the hangers, gears, and shafts connected to the lead screw are damaged. To check for this, turn the power OFF. Turn the lead screw by running the dRh follow-up output line from limit to limit. Note any binding or sticking.

Check

Turn the power ON.

Set E at 0° .

The spur gear on the lead screw of the dRh vector gear should be toward the left.

The dRh component solver can be seen through the access on the right side of the front top section, just forward of the RdB s follow-up. It is the third component solver from the top.

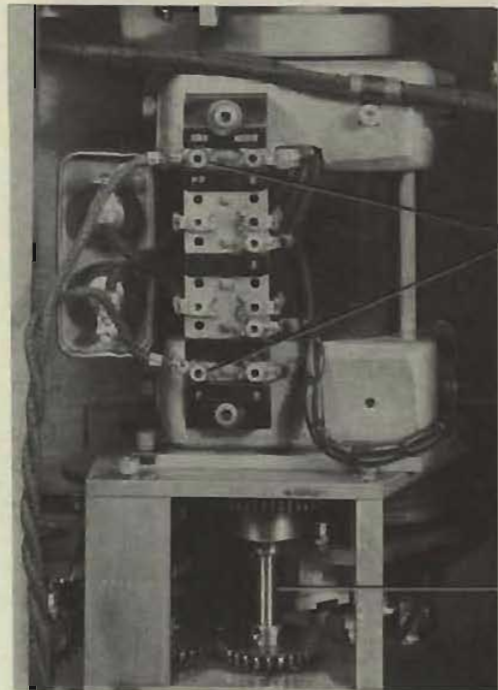
Remove leads P and PP from the dRh follow-up.

Turn the dRh output gearing to one limit of L-5.

Mark the RdE follow-up for use as an indicator.

Turn the dRh output gearing to the other limit of L-5.

The indicating marks on the RdE follow-up should remain matched.



Adjustment

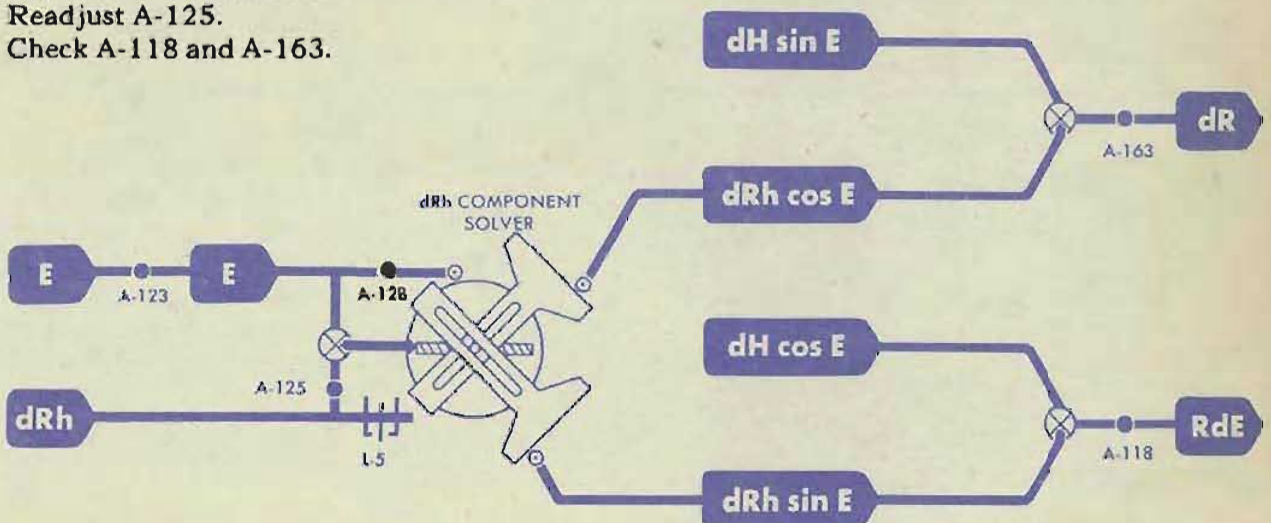
If the indicating marks do not remain matched within one half tooth, loosen A-128. Correct halfway by turning the dRh vector gear with a gear pusher. Tighten A-128, and recheck.

REMINDER

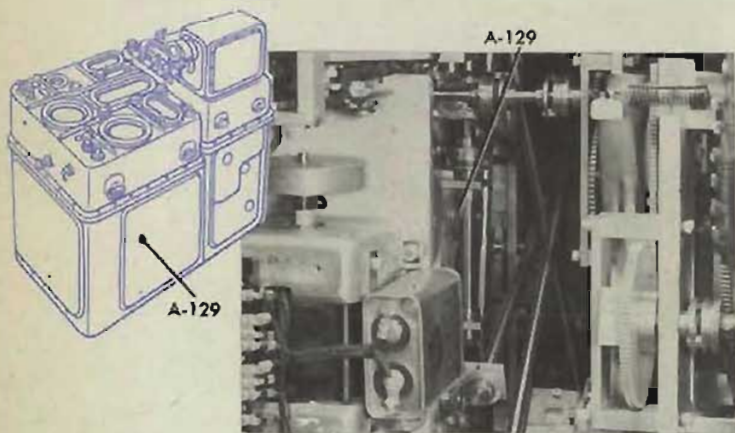
Replace leads P and PP.

Readjust A-125.

Check A-118 and A-163.



A-129 Sw HOLDING FRICTION



Location

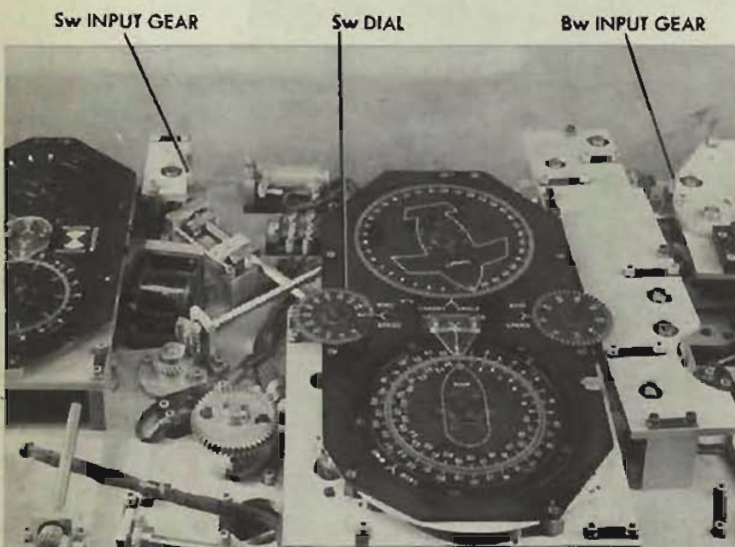
A-129 is under cover 5, behind the follow-up mounting plate and in the center of the computer pedestal.

Check

The friction should be tight enough to hold the Sw input setting without too much drag on the line.

Set Sw at 45 knots.

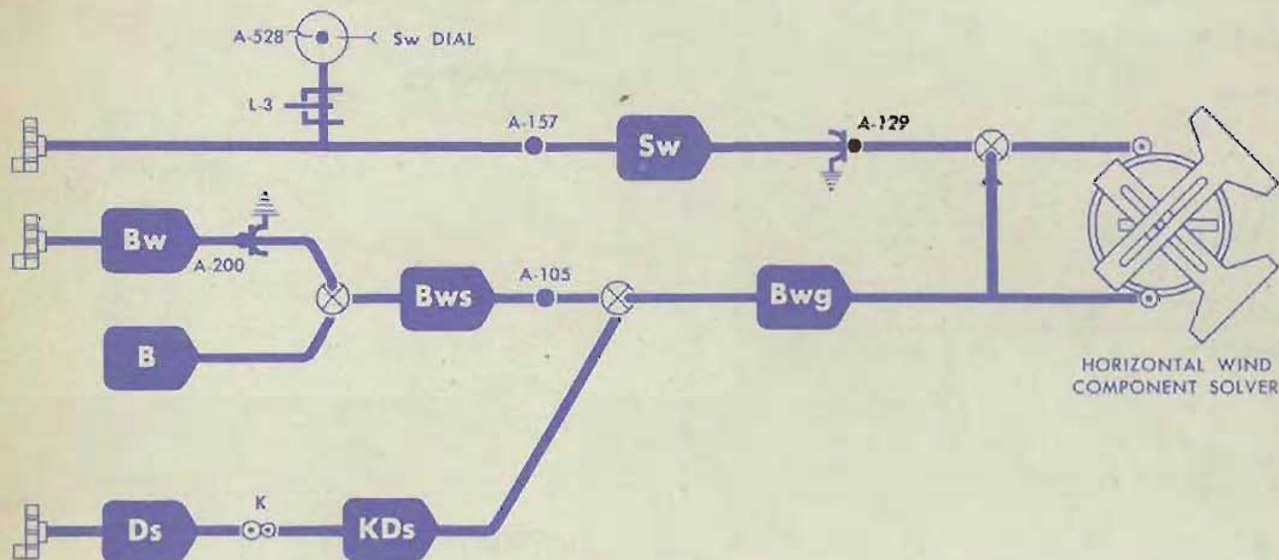
Turn the Bw input gear. There should be no motion of the Sw input gear.



Adjustment

If any motion backs out on the Sw input gear, loosen A-129 and turn it clockwise to increase the friction.

Tighten A-129, and recheck.



A-130 jHc FRICTION DRIVE

Location

A-130 is under cover 1. It is the driving friction on the *jHc* line.

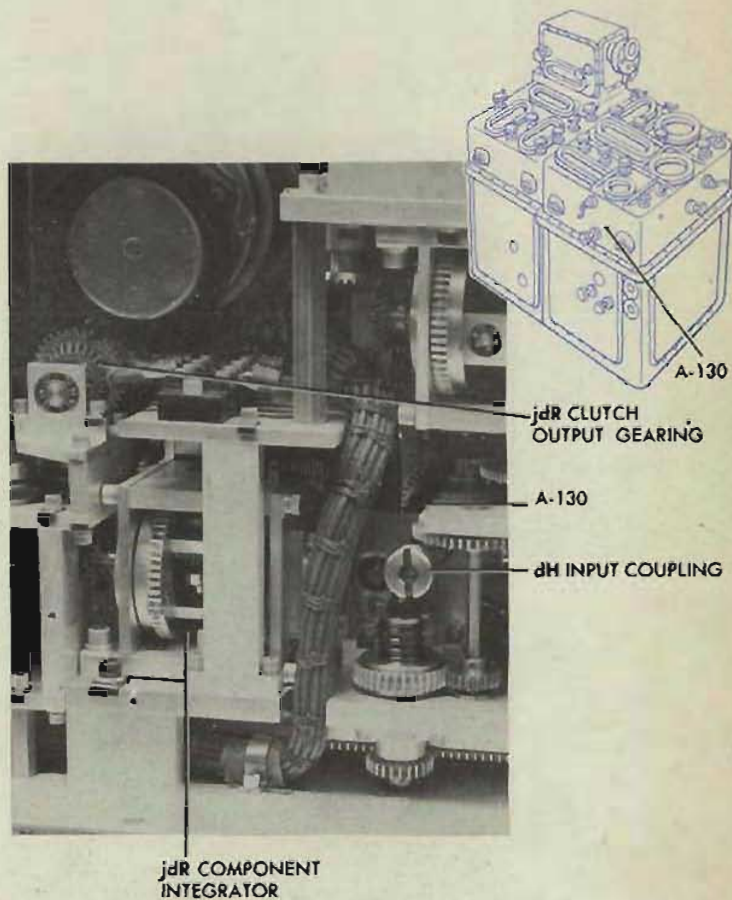
Check

This friction should *slip* when *dH* is introduced manually. It should *drive* the *dH* line when there is *jHc* output from the component integrators.

Set *E* at a high value.

Turn the *dH* input line. The *dH* dial should move, but *dH* should not back through the *jHc* line.

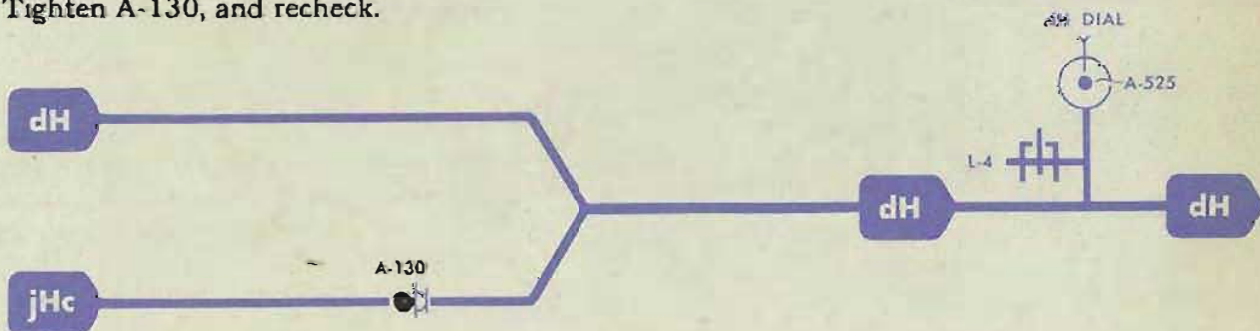
Turn the output gearing of the *jdR* clutch to turn *jHc*. The *dH* line should turn and change the reading of the *dH* dial.



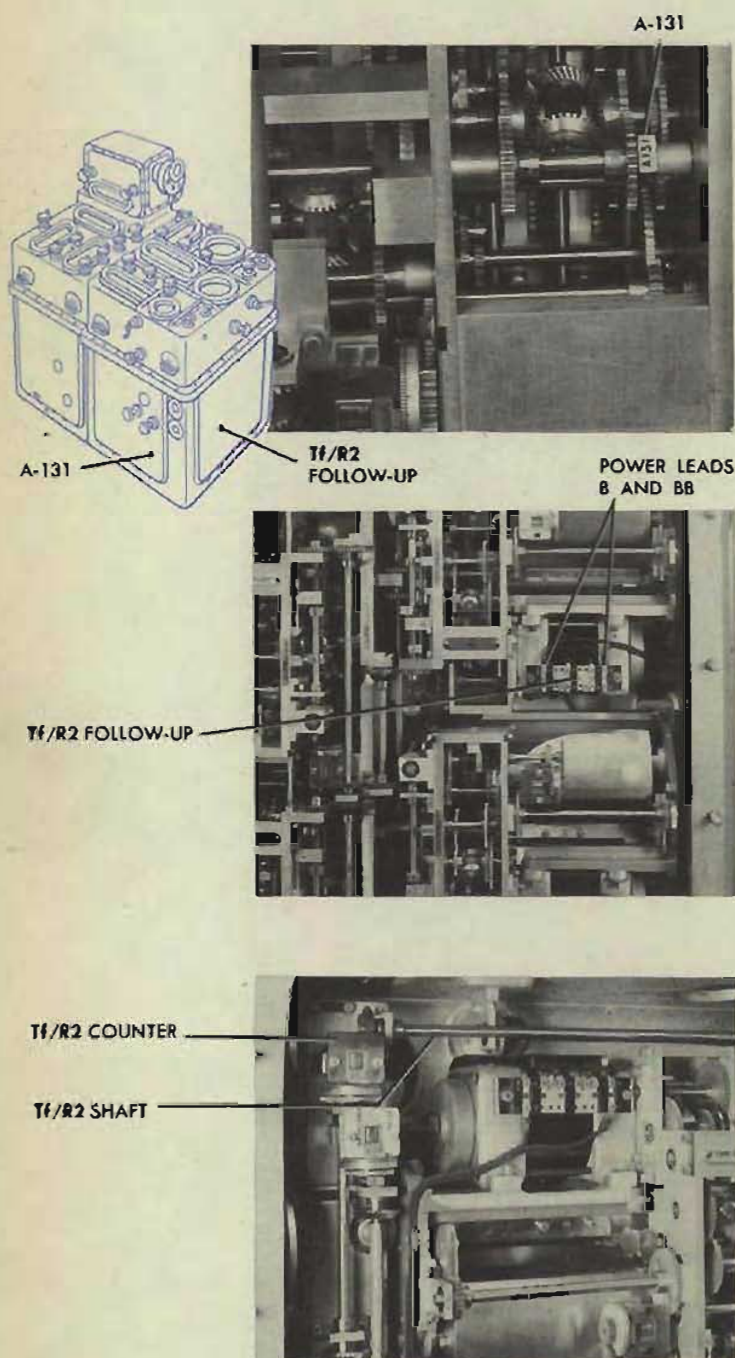
Adjustment

If there is no motion of the *dH* line when *jHc* is turned, loosen A-130 and turn it clockwise to increase the friction.

Tighten A-130, and recheck.



A-131 DEFLECTION MULTIPLIER to RdBs LINE



Location

A-131 is under cover 3.

Check

Remove leads B and BB from the *Tf/R2* ballistic computer.

Turn the power ON.

Set *So*, *Sh*, and *Sw* at 0 knots.

Set *Bws* at 0° .

Set *A* and *Br* at 0° .

The $K(RdBs + K, WrD)$ input rack of the deflection prediction multiplier should now be at its zero position. At the zero position, turning the *Tf/R2* lead screw input (under cover 4) from limit to limit causes no motion of the *Dtw'* output rack.

Set the *Tf/R2* line at its lower limit by turning the shaft leading to the counter under cover 4.

Mark the *Dtwj* follow-up output gear for use as an indicator.

Turn *Tf/R2* to its upper limit. If the output gear on the *Dtwj* follow-up moves more than one tooth, A-131 is in error and should be adjusted.

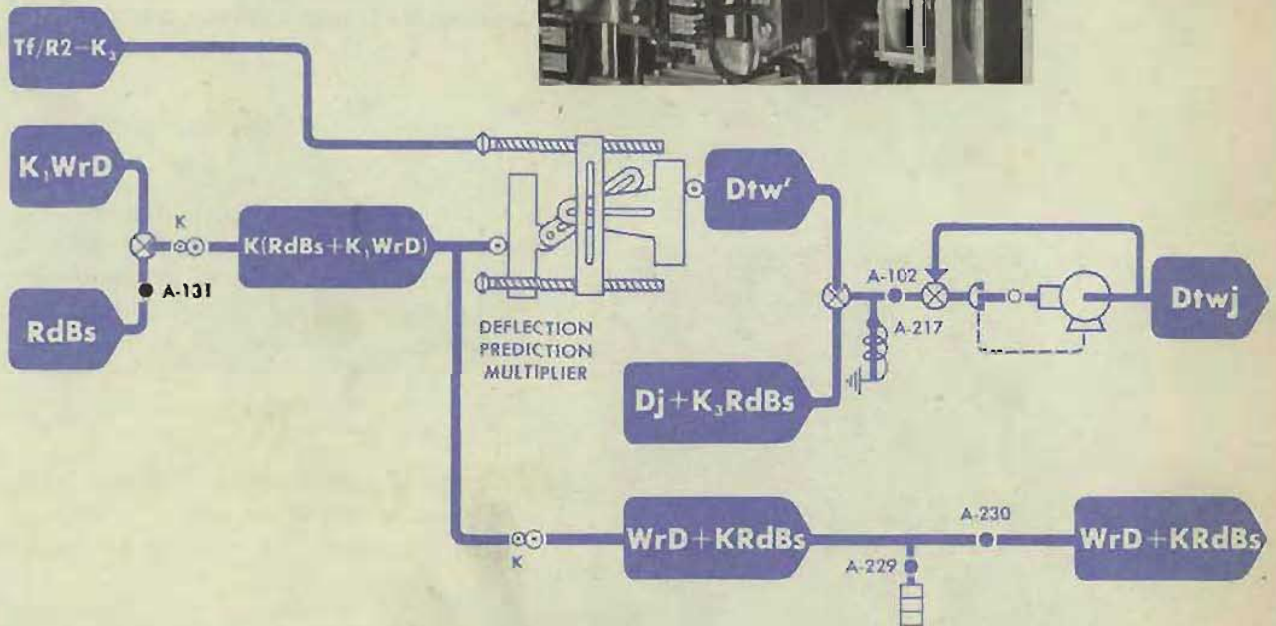
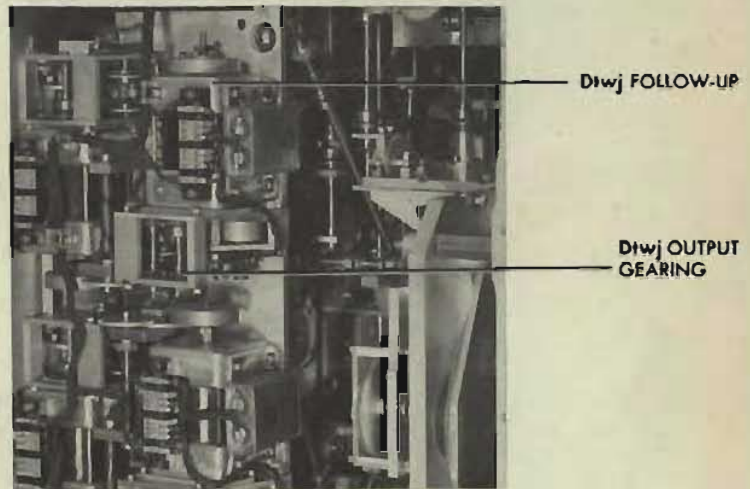
Adjustment

The input rack can be set approximately. Hold the spur gear behind A-131, and loosen the clamp. Turn the gear until the two teeth at the top of the input rack (the third rack from the front) are hidden by the plate. Make A-131 slip-tight.

Refining the adjustment

Repeat the check. If there is still any output on the *Dtwj* follow-up, hold *Tf/R2* at its upper limit and turn the spur gear behind A-131 to correct the full amount of motion.

Tighten A-131 and recheck.
Replace the *Tf/R2* power leads.
Check A-102 and A-229.



A-132 DEAD TIME MULTIPLIER to *dR* LINE (SER. NOS. 780 and LOWER)

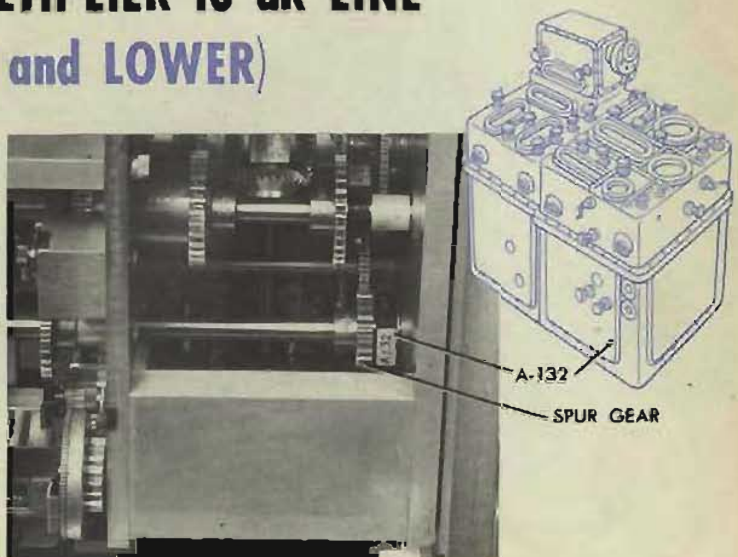
Location

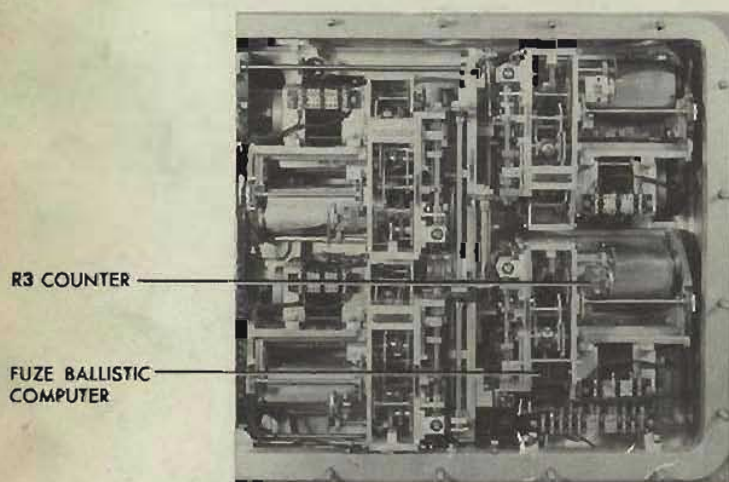
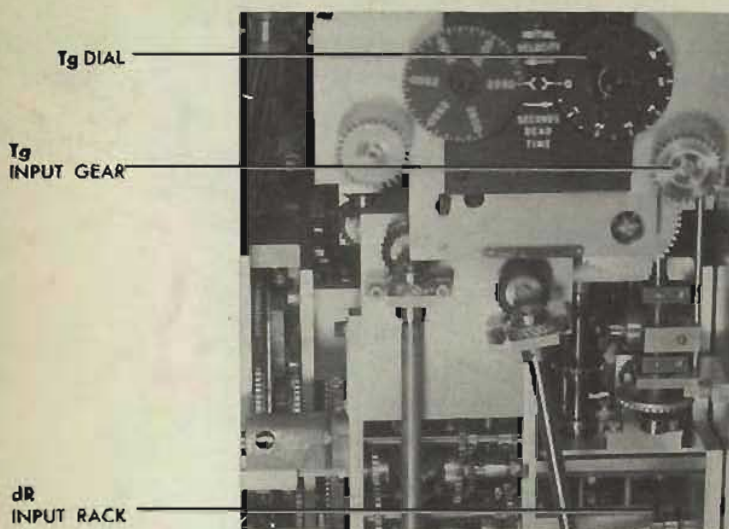
A-132 is under cover 3, at the lower front.

Check

Set *So*, *Sh*, and *dH* at 0 knots.
Put the *dR* handcrank at AUTO.

Turn the power ON.





The dR line is now at its zero position. In this position, the RTg output rack should not move when the Tg lead screw is turned.

Turn the Tg input from 0 to 6 seconds.

Observe the $R3$ counter in the fuze ballistic computer under cover 4 for motion of the RTg output rack.

Adjustment

If the $R3$ counter moves, first make an approximate readjustment of the input rack.

Hold the small spur gear to the rear of A-132 and loosen the clamp.

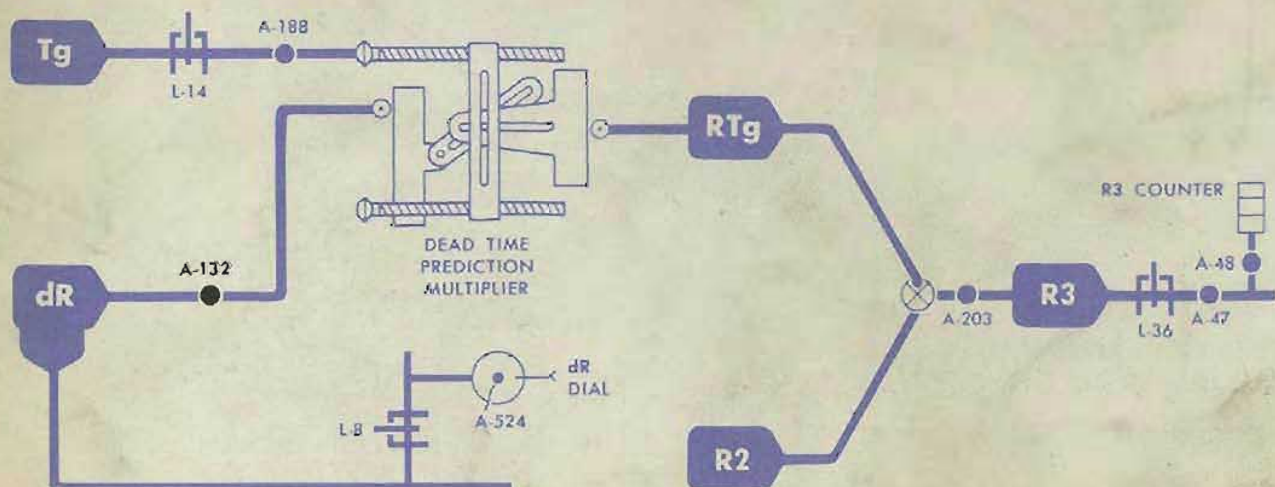
Turn the spur gear until the top two teeth of the dR input rack of the Tg prediction multiplier are hidden by the plate. The dR input rack is the front rack of the multiplier group.

Make A-132 slip-tight. Repeat the check.

If the $R3$ counter still moves, keep Tg at 6 seconds and refine the adjustment by turning the spur gear to correct the full amount of motion.

Tighten A-132, and recheck.

Check A-203.



A-132 DEAD TIME MULTIPLIER to dRs - dRm LINE (SER. NOS. 781 and HIGHER)

Location

A-132 is under cover 3, at the lower front.

Check

Turn the power ON.

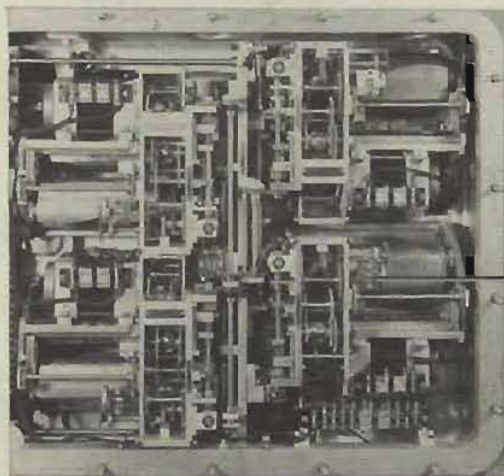
Set S_o , S_h , and dH at 0 knots.

Set $I.V.$ at 25 ~~50~~.

Put the dR handcrank in AUTO.

Put the fuze handcrank in the IN position. Turn the lead screw input from 0 to 6 seconds by turning the Tg input gear at the right of the Tg dial.

Observe the $R3$ counter in the fuze ballistic computer under cover 4 for motion of the RTg output rack.



R3 COUNTER

Adjustment

If the $R3$ counter moves when Tg is turned, first make an approximate re-adjustment of the input rack. Hold the small spur gear to the rear of A-132 and loosen the clamp.

Turn the spur gear until the top two teeth of the input rack of the Tg prediction multiplier are hidden by the plate. The input rack is the front rack of the multiplier group.

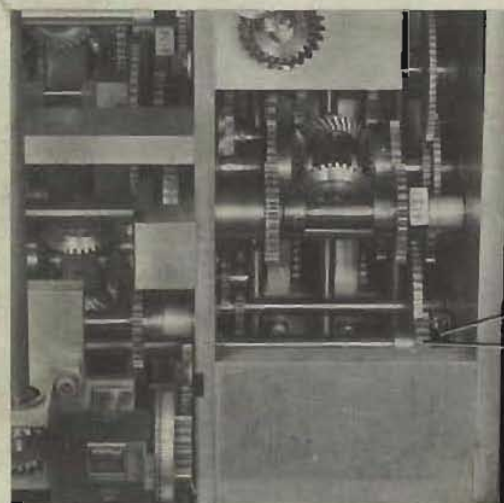
Make A-132 slip-tight.

Repeat the check.

If the $R3$ counter still moves, keep Tg at 6 seconds and refine the adjustment by turning the spur gear to correct the full amount of motion.

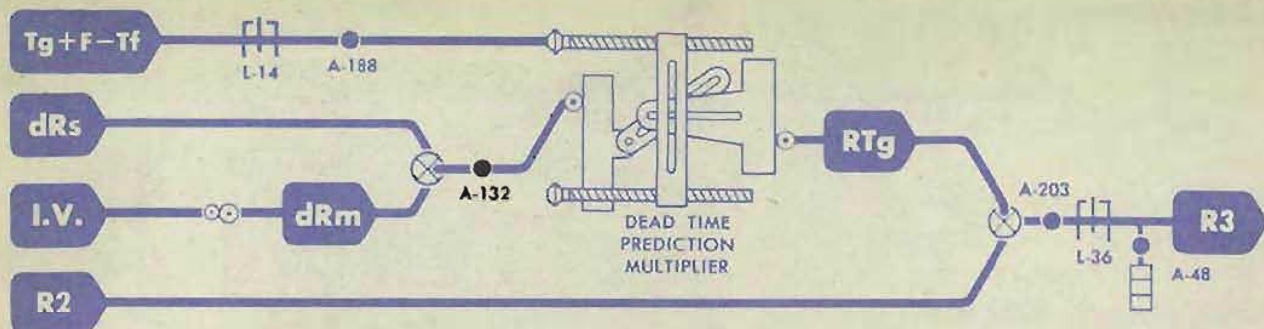
Tighten A-132, and recheck.

Check A-203.

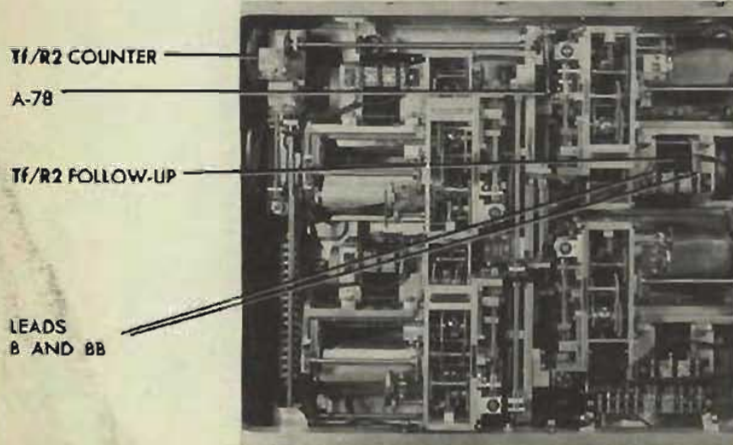
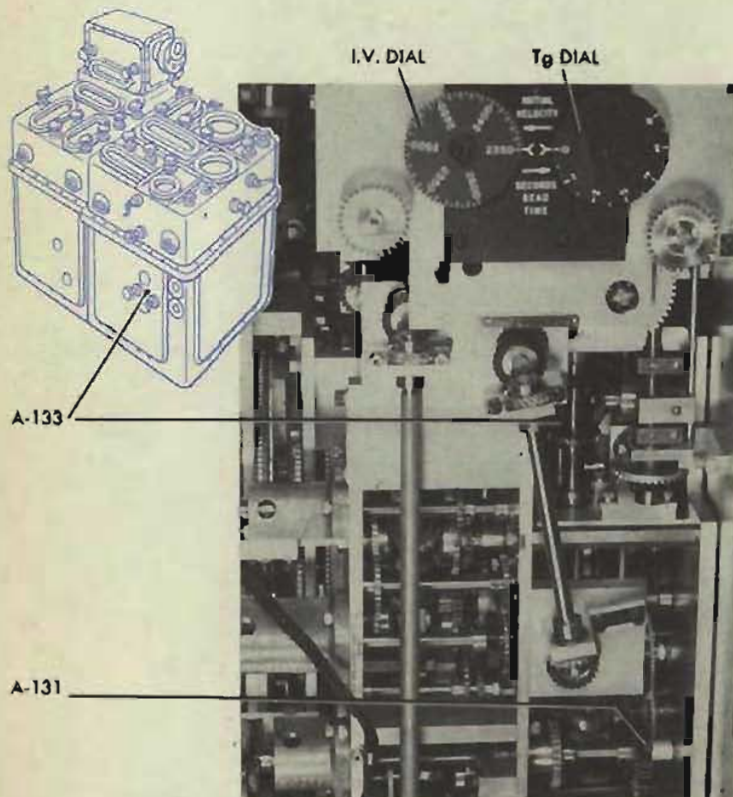


A-132

SPUR GEAR



A-133 DEFLECTION MULTIPLIER to Tf/R2 COUNTER



Location

A-133 is under cover 3.

Check

Remove leads B and BB from the *Tf/R2* ballistic computer. Set the *Tf/R2* counter at 0.00125 (0.001184 for Mods 8 and 12) by turning the gearing leading to the counter and wedge the line.

Turn the power ON.

The lead screw input of the deflection prediction multiplier should now be positioned so that motion of the $K(RdBs + K, WrD)$ input rack causes no motion of the Dtw' output rack.

Motion of the Dtw' rack can be observed on the $Dtwj$ follow-up output gearing.

To move the $K(RdBs + K, WrD)$ input rack independently, loosen A-131. Turn the spur gear to the rear of the clamp until the input rack is at one limit.

Mark the $Dtwj$ follow-up for use as an indicator. Turn the gear next to A-131 to the other limit of the rack. Note any motion of the indicating gear. If there is motion of more than one tooth, A-133 is in error and should be readjusted.

Adjustment

Loosen A-133 and turn the small gear above it in a decreasing direction until the lead-screw input reaches its lower limit.

Check the decreasing direction by decreasing $Tf/R2$ and observing the motion of the small gear.

Hold the gear against the limit and set the $Tf/R2$ counter at 0.001198 (0.001146 for Mods 8 and 12).

NOTE: Before this value can be reached, A-78 must be loosened.

Make A-133 slip-tight.

Turn the $Tf/R2$ shaft and lead screw until the counter reads 0.00125 (0.001184 for Mods 8 and 12).

Wedge the $Tf/R2$ gearing.

Refining the adjustment

Repeat the check. If the adjustment is still off, correct by turning the spur gear directly above the clamp until moving the multiplier input rack from limit to limit causes no motion of the $Dtwj$ follow-up output gearing.

Hold the spur gear above A-133 and slip the $Tf/R2$ shaft until the counter reads 0.00125 (0.001184 for Mods 8 and 12).

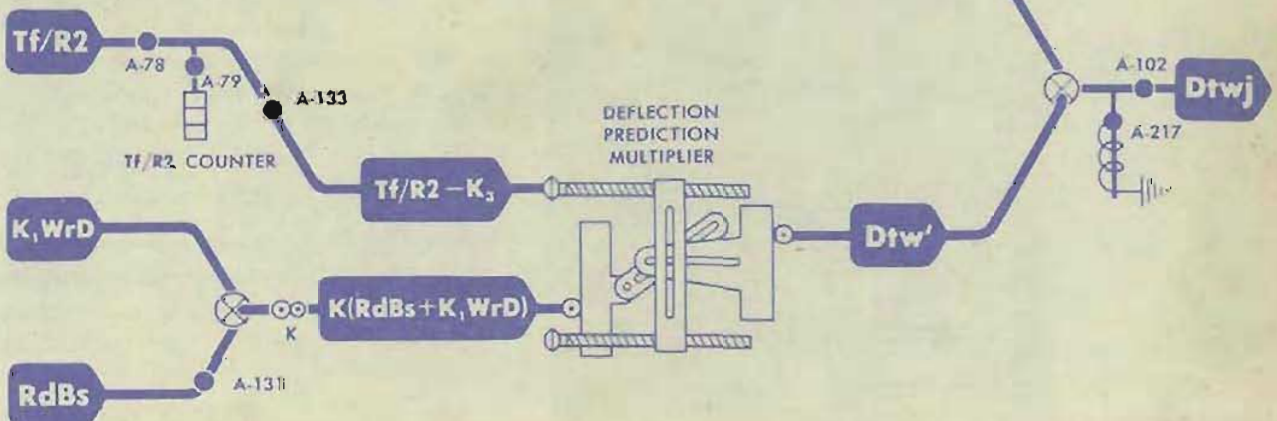
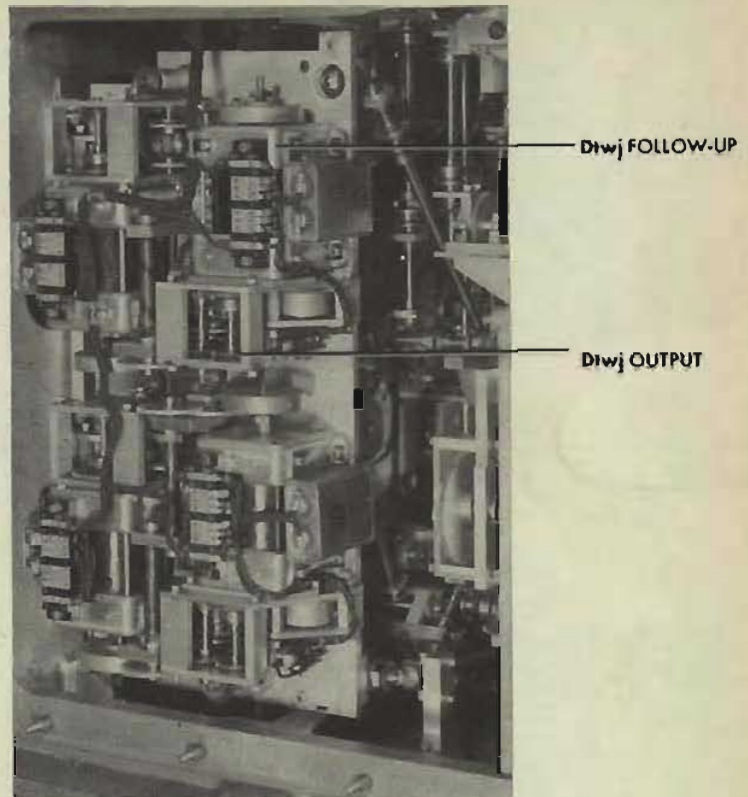
Tighten A-133, and recheck.

Readjust A-78.

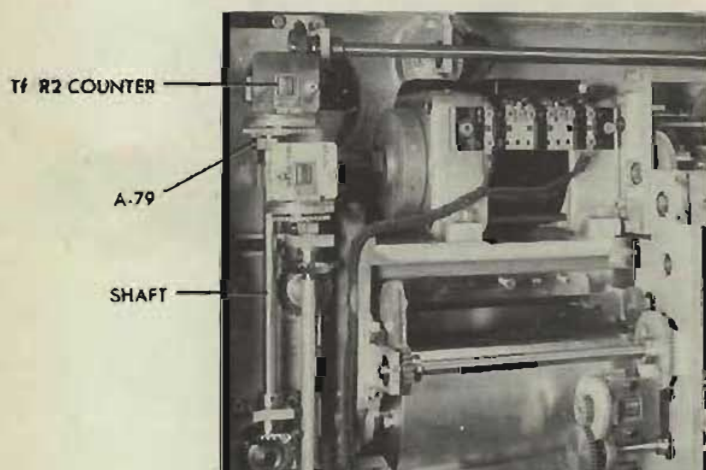
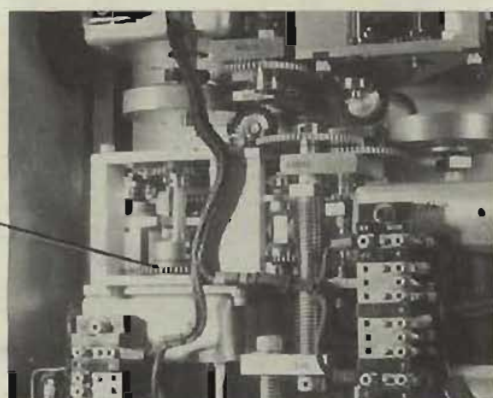
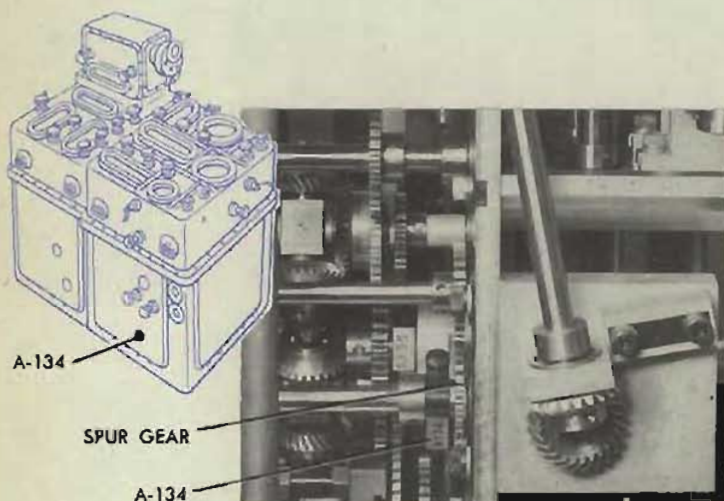
Remove all wedges.

Replace the $Tf/R2$ power leads.

Readjust A-131. Check A-102.



A-134 ELEVATION MULTIPLIER to WrE LINE



Location

A-134 is under cover 3, on a horizontal shaft about 14 inches below the center of the *I.V.* dial mask.

Check

Turn the power ON.

Set *So*, *Sh*, *Sw*, and *dH* at 0 knots.
Set *E2* at 0°.

The $K(RdE - K, WrE)$ input rack of the elevation prediction multiplier should now be at its zero position, where movement of the *T1/R2* lead-screw input causes no motion of the *Vtw'* output rack.

The *V* follow-up output gearing is used to indicate motion of the *Vtw'* output rack.

Remove the power leads from the *T1/R2* ballistic computer.

Set *T1/R2* at its lower limit.
Mark the *V* follow-up output gearing.

Turn the *T1/R2* shaft below A-79 under cover 4, until the *T1/R2* lead-screw input is at its upper limit. If the motion is more than one tooth on the *V* follow-up, A-134 is in error and should be readjusted.

Adjustment

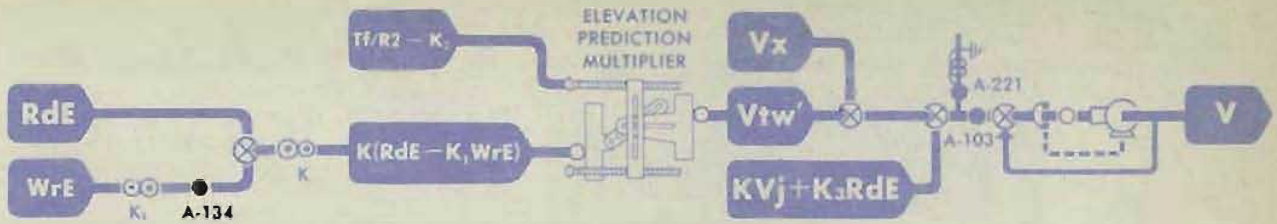
If the *V* follow-up output gearing moves more than one tooth, hold the spur gear next to A-134 and loosen the clamp.

Turn the spur gear until the top two teeth of the $K(RdE - K, WrE)$ input rack are hidden by the plate. This rack is the second from the front.

Make A-134 slip-tight.
Repeat the check. If there is any motion of the *V* follow-up, correct by turning the spur gear until there is no output for full travel of the multiplier lead-screw input.

Tighten A-134, and recheck.

Check A-103.



A-135 RANGE MULTIPLIER to dRs LINE

Location

A-135 is under cover 3, below the I.V. dial.

Check

- Disconnect leads A and AA from the *Tf* ballistic follow-up.
- Set I.V. at 2550 f.s.
- Turn the power ON.
- Set *So*, *Sh*, *Sw* and *dH* at 0 knots.
- Set *A* and *Br* at 90°.
- Set *E2* at 78.95°. (On Mods 8 and 12, set *E2* at 80.496°.)

The $K(dRs + K,WrR)$ input rack of the range prediction multiplier should now be at its zero position, where movement of the *Tf* lead-screw input causes no motion of the *Rtw'* output rack.

The *R2* follow-up output gearing is used as an indicator of motion of the *Rtw'* output rack.

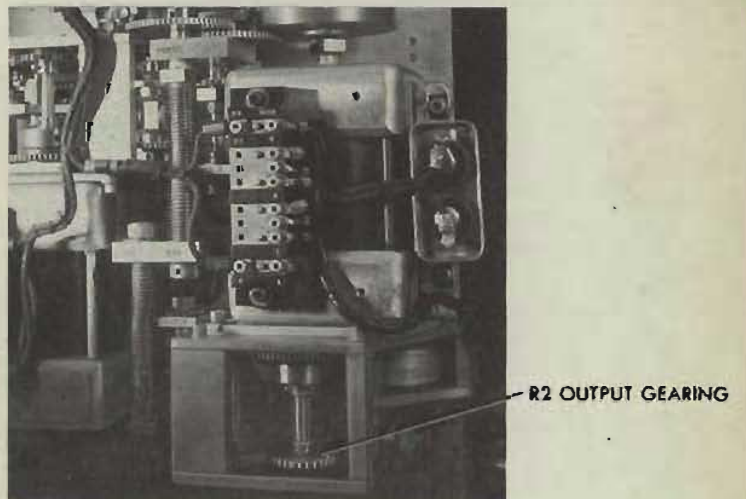
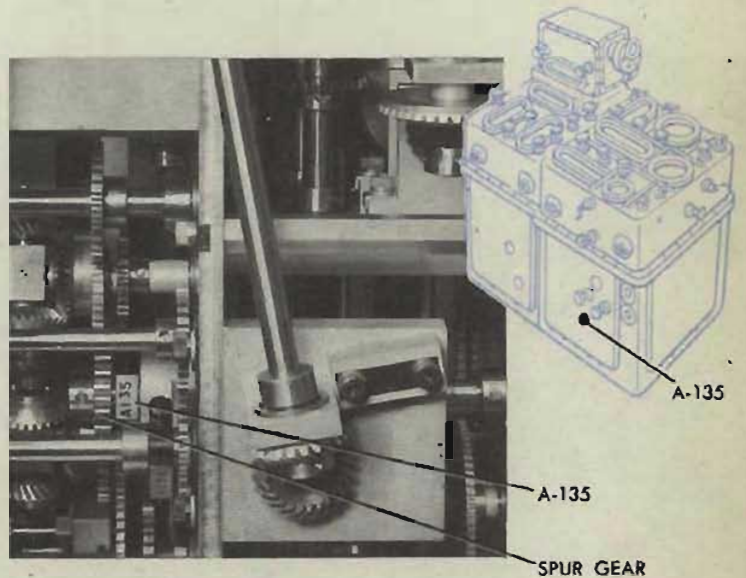
Turn *Tf* from its lower limit to its upper limit by turning the horizontal shaft below the *Vl + Pe* ballistic computer.

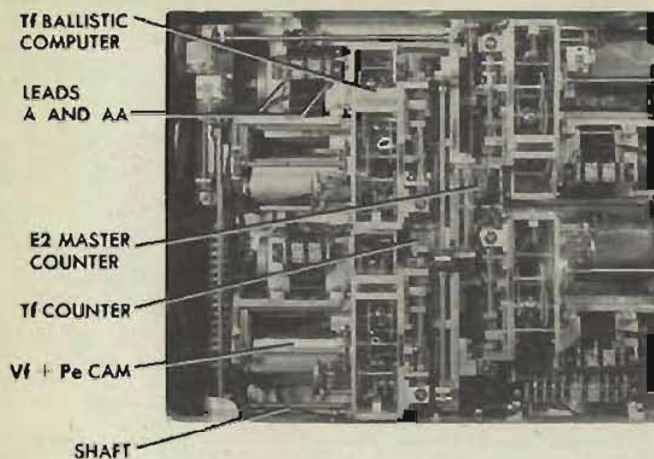
Adjustment

If there is any motion of the *R2* follow-up output gearing, hold the small spur gear at the rear of A-135 and loosen the clamp.

Turn the gear until the top of the $K(dRs + K,WrR)$ input rack can be seen. This rack is the rear rack of the group. Continue turning the gear until the top two teeth are hidden by the mounting plate.

Make A-135 slip-tight.





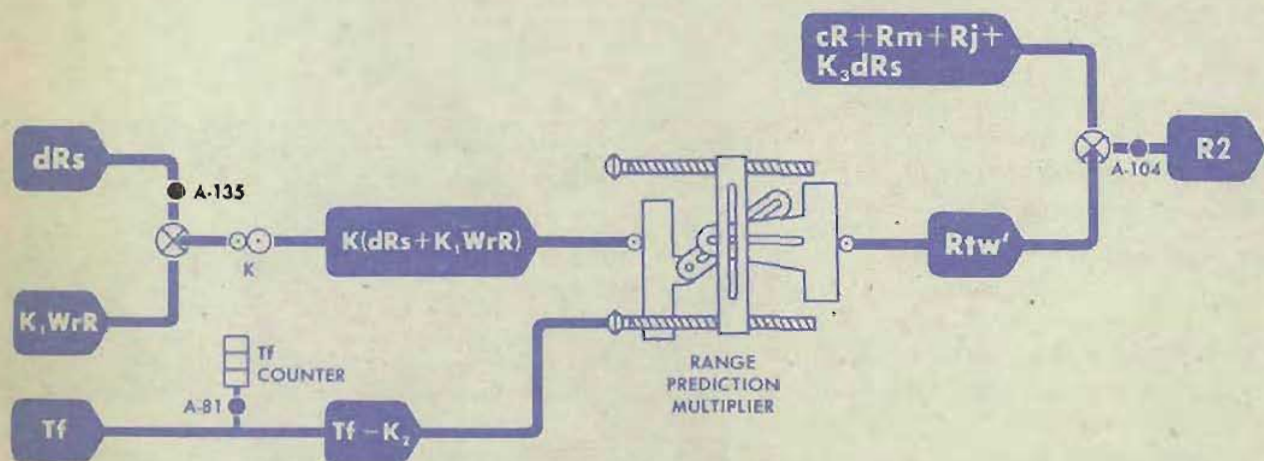
Refining the adjustment

Set Tf at 5.00 seconds (or 8.00 seconds on Mods 8 and 12) and make a new indicating mark on the $R2$ follow-up output gearing.

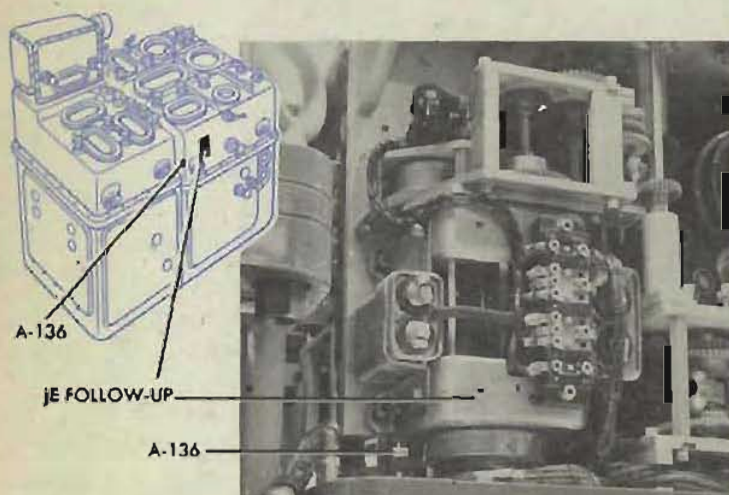
Turn Tf to its upper limit and observe the $R2$ follow-up.

Correct all the way by turning the gear behind A-135 until the indicating marks match again. Repeat until there is no output when the Tf lead screw is turned.

Tighten A-135, and recheck. Reconnect the Tf power leads. Check A-104.



A-136 VECTOR SOLVER to A DIAL



Location

A-136 is under cover 1, at the rear.

Check

Turn the power OFF.

NOTE:

Check A-137 and A-532 before checking this adjustment.

Set B at 0° by setting Co and Br at 0° . Set A at 0° .

Increase Sh from 0 knots to 400 knots. The N-S rack of the vector solver should move toward the front of the computer.

Turn *A* to 270° and wedge the line. Make a mark on one tooth of the N-S rack of the vector solver and a matching mark on the rail above it.

With *B* at 0° and *A* at 270°, decrease *Sh* from 400 to 0 knots.

The pencil marks should remain matched.

Adjustment

If there is any motion of the N-S rack, set *Sh* at 0 knots. Make new indicating marks on the N-S rack and rail.

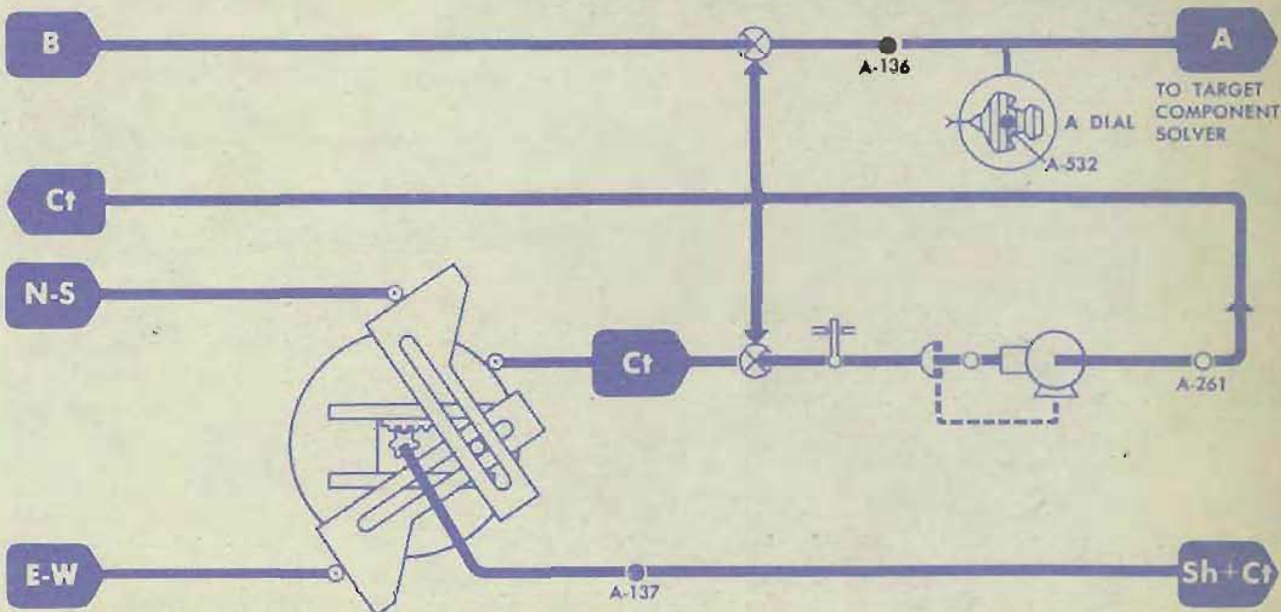
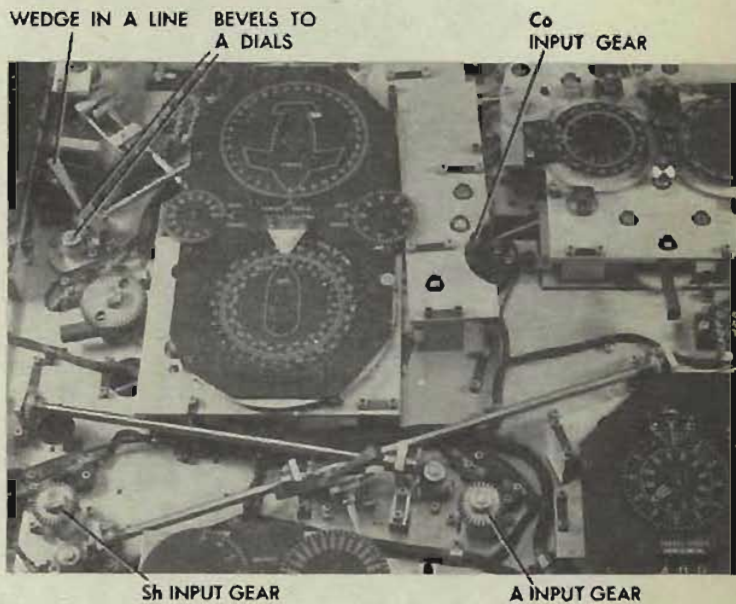
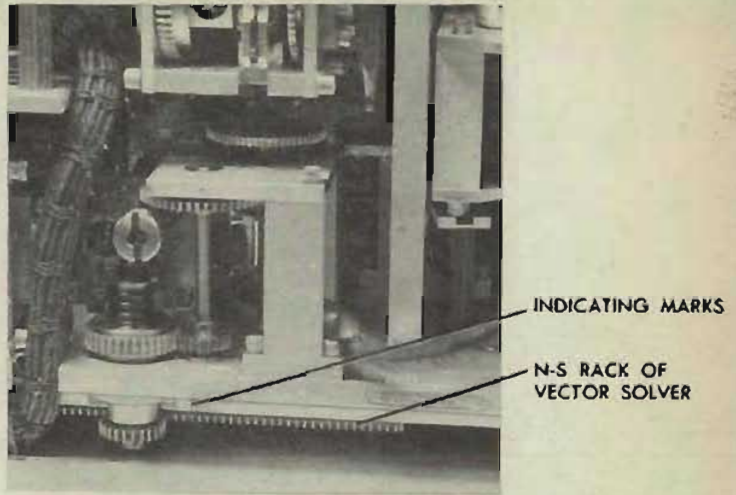
Increase *Sh* to 400 knots. Loosen A-136. Remove the wedges in the *A* line.

Turn the *A* input gear until the new indicating marks match. Hold the *A* input gear and bring the *A* dials back to 270° by turning the bevel gears on the shaft to the *A* dial.

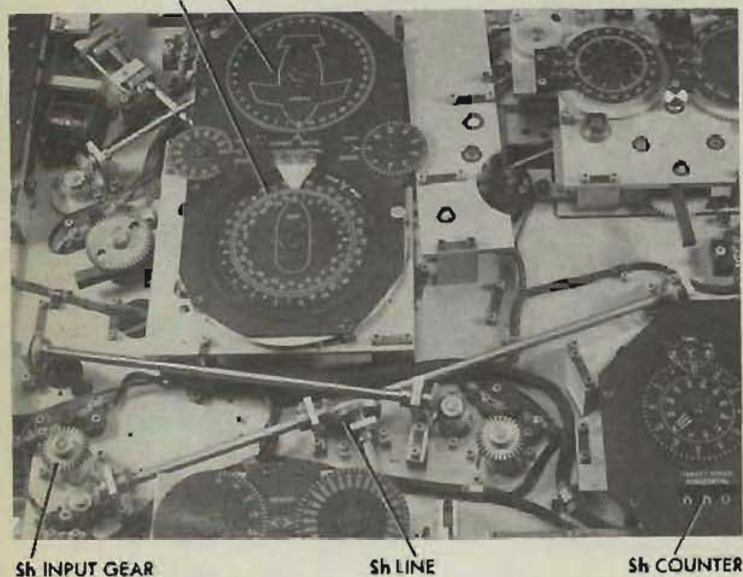
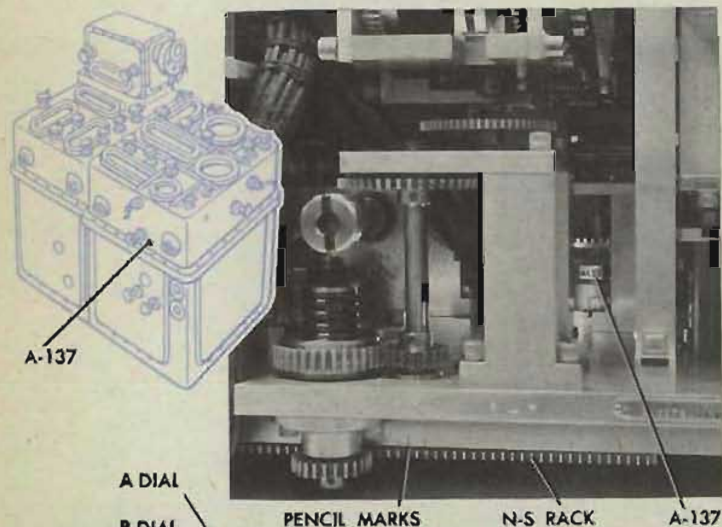
Tighten A-136, and recheck.

CAUTION

When tightening A-136, make sure that the gear near the clamp is all the way down so that it does not interfere with the small spring on the *Ct* follow-up contact arm.



A-137 VECTOR SOLVER to Sh COUNTER



Location

A-137 is under cover 1, to the rear of the *Sh* motor.

Note

Before adjusting A-137, loosen frictions A-205 and A-206.

Do not increase *Sh* until A-137 is adjusted. If A-137 is out of adjustment, the *Sh* speed pin rack may drive out of mesh with its pinion.

Check

Set *Sh* at 0 knots and wedge the line. The speed pin of the vector solver should be at its zero position, so that an input of *Ct* causes no motion of either rack.

Turn *A* through 360°. The N-S rack can be checked for motion by eye.

Adjustment

If there is any motion of the N-S rack: Set *B* at 0° by setting *Co* and *Br* at 0, and wedge the lines.

Set *Sh* at 0 knots and wedge the line. Set *A* at 270°.

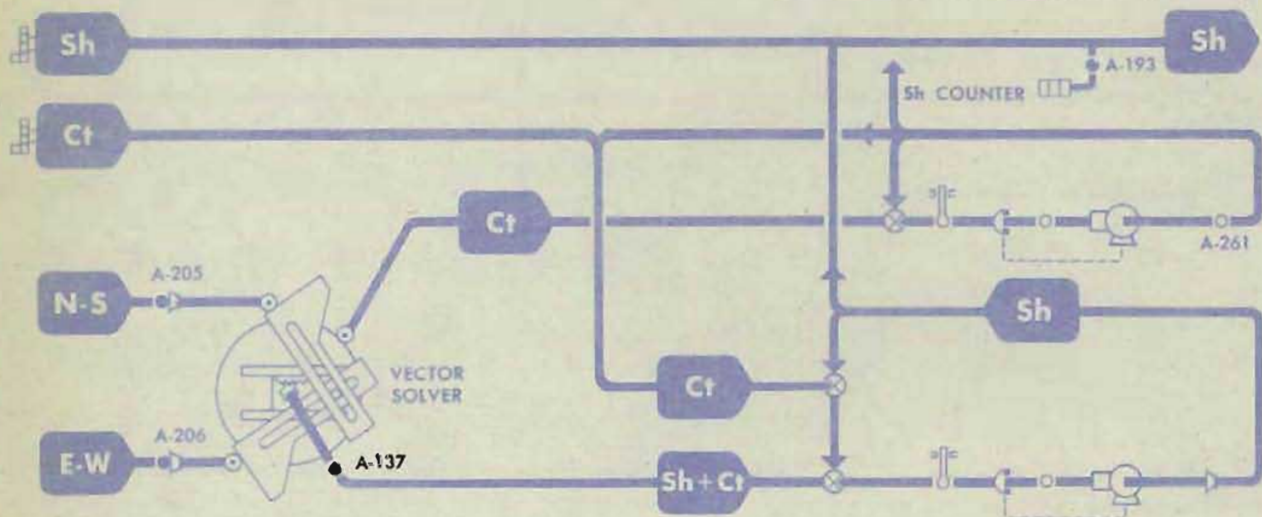
Make matching marks on the N-S rack of the vector solver and the rail above it. Turn *A* to 0°.

Loosen A-137 and turn the spur gear above it to rematch the marks.

Tighten A-137 and recheck by watching the N-S rack for motion when *A* is turned through 360°.

Remove the wedges.

Readjust A-205 and A-206.



A-138 HEIGHT COMPUTER to cR DIALS

Location

A-138 is under cover 1, at the left front edge of the fine *Br* dial.

To reach A-138, remove the *Br* dial mask. A-138 can be seen and reached through a small access hole near the front of the index on the fine *Br* dial.

Check

Set *E* at 30°.
 Set *cR* at 8000 yards.
 The *H* dials should read 12,000 feet.

Adjustment

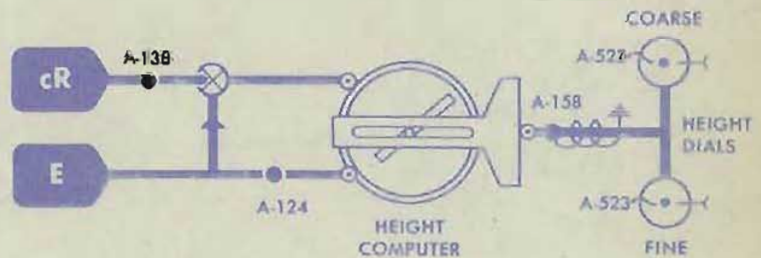
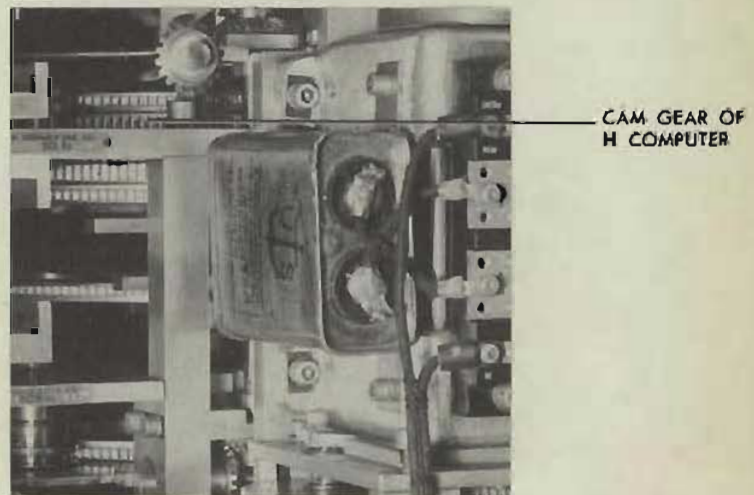
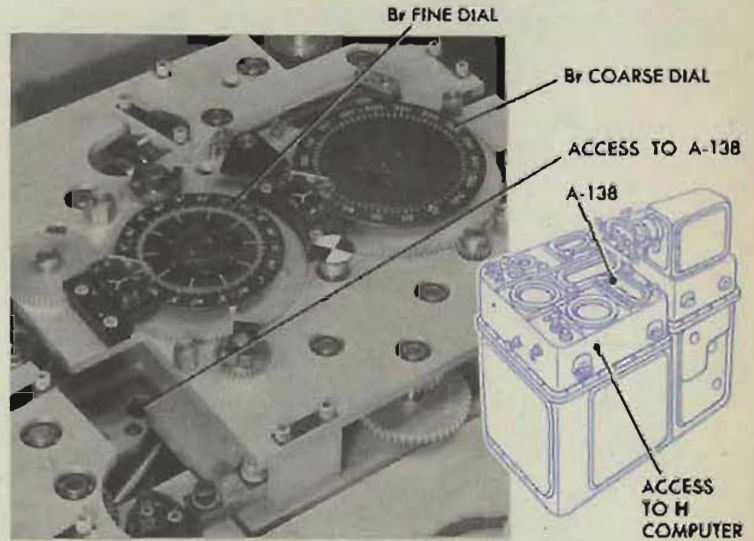
If the *H* dials do not read 12,000 feet, make A-138 slip-tight. Use a gear pusher to turn the height computer cam until the *H* dials read 12,000. The height computer is the top component solver in the relative motion component solver group.

Tighten A-138 and recheck at the values of *cR* given in the table. Set *cR* on these values from both an increasing and a decreasing direction to check for spread of error due to lost motion.

H CHECK VALUES

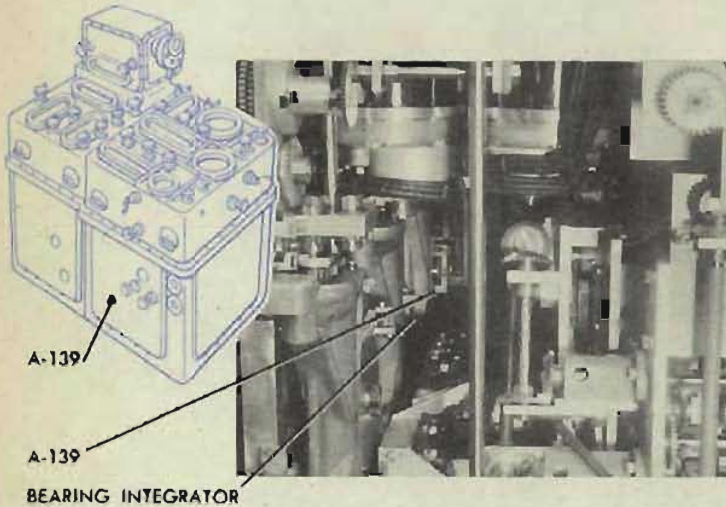
<i>cR</i>	<i>E</i>	<i>H</i>
2,000 yards	30°	3,000 feet
10,000 yards	30°	15,000 feet
30,000 yards	30°	45,000 feet

Check A-522 and A-523.



A-139 and A-140

BEARING INTEGRATOR to RdBs LINE



Location

A-139 is under cover 3, on the spur gear of the carriage input to the bearing integrator. A-140 is to the rear of A-139, under cover 5.

A-139 is the vernier adjustment screw. A-140 is the coarse adjustment clamp.

Check

Turn the power ON.

Set S_o and S_h at 0 knots.

Set A at 0° .

Set cR at 5000 yards.

Set Br at 0° .

The $RdBs$ line is now at its zero position.

The carriage of the bearing integrator should be at the center of the disk.

Start the time motor to rotate the disk.

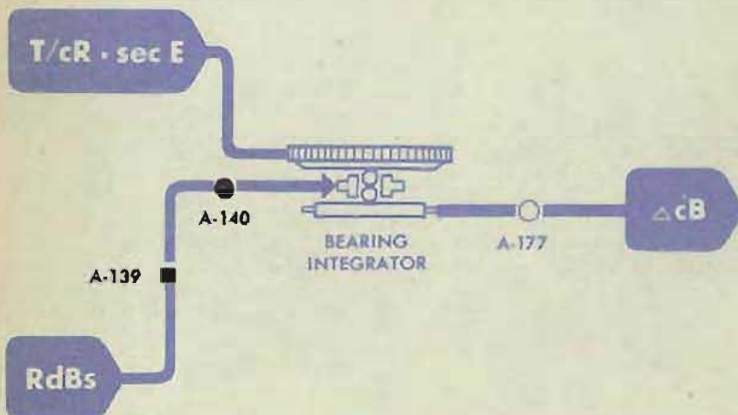
There should be no motion of the bearing integrator roller while the disk is turning.

Adjustment

If there is any motion of the integrator roller, check A-140. If it is loose, push the integrator carriage to the approximate center and tighten A-140. Loosen the locking screw of A-139 and turn the vernier adjustment screw until there is no movement of the output roller.

Tighten the locking screw and recheck.

Recheck the bearing B tests.



A-141 ASSEMBLY CLAMP

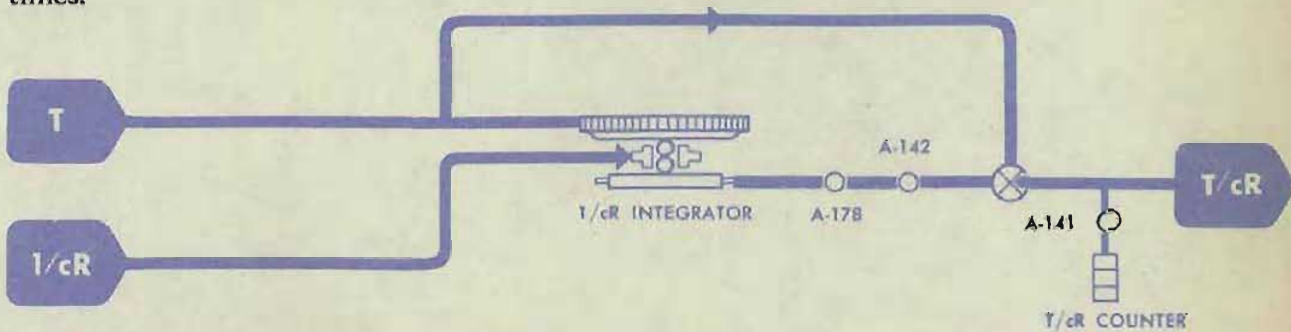
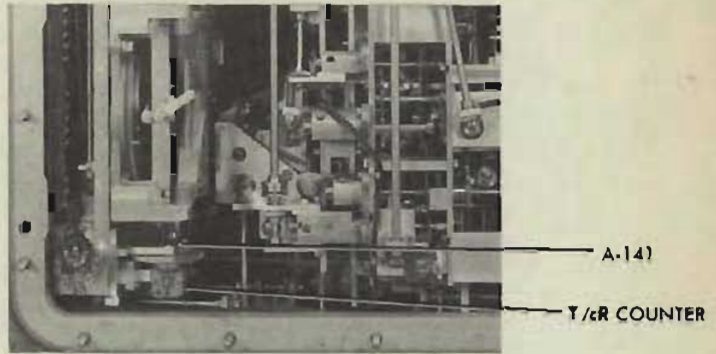
Location

A-141 is under cover 3, on the gear meshing with the *T/cR* counter gear. On later instruments the gear on which A-141 is mounted slides out of mesh with the counter gear.

Check

If a sliding gear is provided, A-141 should be tightened with the gear out of mesh except while the integrators are being timed.

On the earlier instruments, A-141 should be tightened in mesh at all times.



A-142 ASSEMBLY CLAMP

Location

A-142 is under cover 5, and is one of two clamps on the roller output coupling of the *1/cR* integrator.

Check

See the readjustment procedure of A-178.

A-143 ASSEMBLY CLAMP

Location

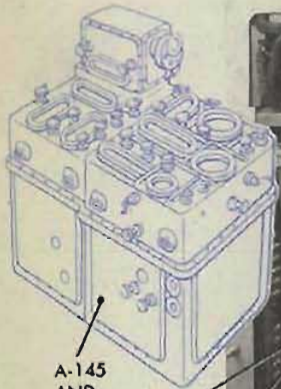
A-143 is under cover 3, and is one of the two clamps on the roller output coupling of the sec *E* integrator.

Check

See the readjustment procedure of A-176.

A-145 and A-146

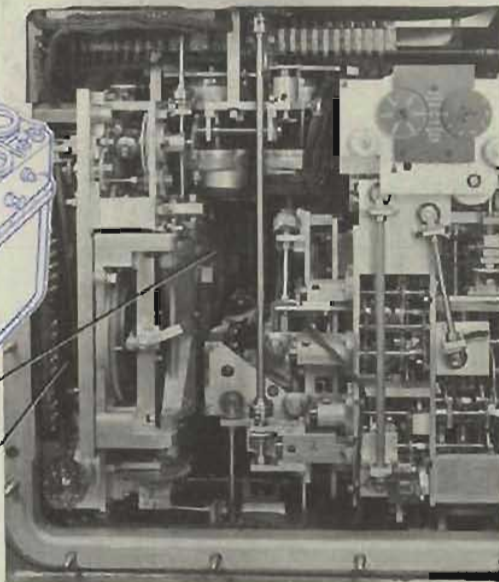
SECANT E CAM to E DIALS



A-145
AND
A-146

sec E
INTEGRATOR

ACCESS TO
A-145 AND
A-146



Location

A-145 and A-146 are under cover 3, at the lower rear, behind the sec *E* cam.

A-145 is the vernier adjustment screw. A-146 is the coarse adjustment clamp. (A-210 is used in place of A-146 in earlier instruments.)

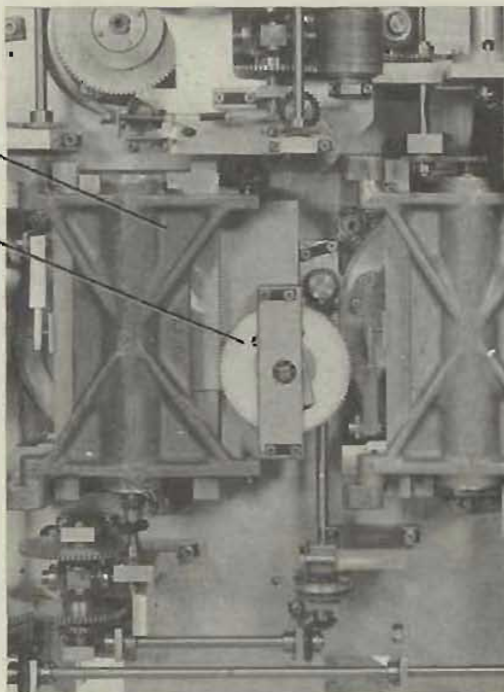
Note

In instruments with Ser. Nos. 389 and lower, A-146 is an assembly clamp. Check that it is tight. See A-210.

In instruments with Ser. Nos. 390 and higher, A-146 is an adjustment clamp.

sec E
INTEGRATOR

sec E INPUT
SPUR GEAR



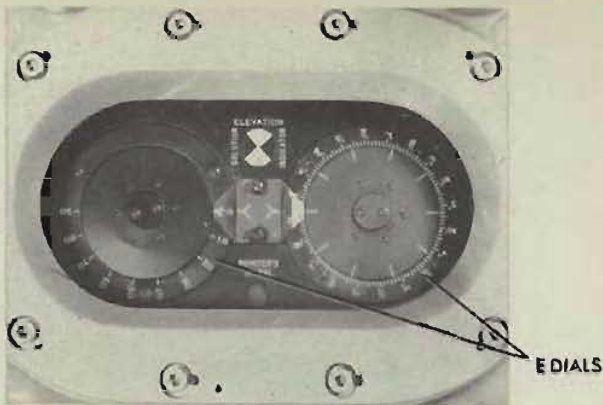
Check

Increase *E* until the sec *E* cam follower just ceases to move. This is the start of the outer constant radius of the cam.

Motion of the follower can be observed on the spur gear of the carriage input to the sec *E* integrator.

INTEGRATOR ASSEMBLY REMOVED
FROM THE COMPUTER

The sec *E* cam is then at a position where further movement of the cam does not move the cam follower. Note the reading of the *E* dials.



Increase *E* above 80°. Decrease *E* steadily until the follower just starts to move. Note the reading of the *E* dials.

The average of the two readings should be 71° 12'.

Adjustment

If the average reading of *E* is not 71° 12', first check A-146 (A-210 in earlier instruments). If it is loose, set *E* at 71° 12' and turn the cam until the follower just starts to move. Tighten A-146.

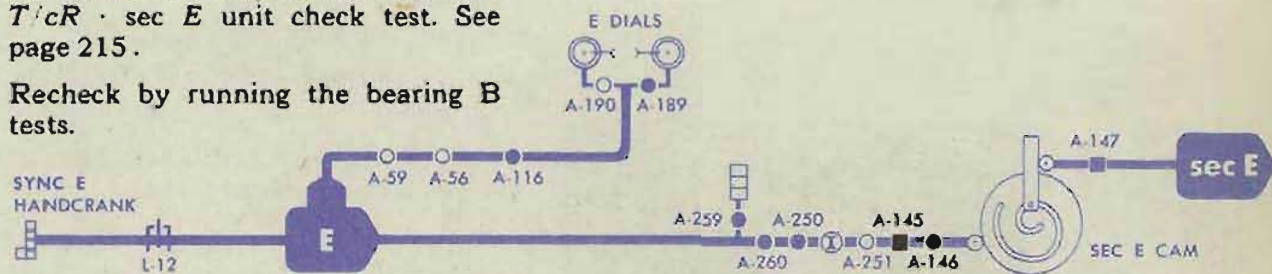
If A-146 is tight but the average reading of *E* is not 71° 12', loosen the A-145 locking screw and turn the A-145 vernier adjustment screw until the average reading is correct.

Tighten the locking screw and recheck.

Note

This is a preliminary adjustment. To refine the adjustment run the *T/cR* · sec *E* unit check test. See page 215.

Recheck by running the bearing *B* tests.



A-147 SECANT E INTEGRATOR to SECANT E CAM

Location

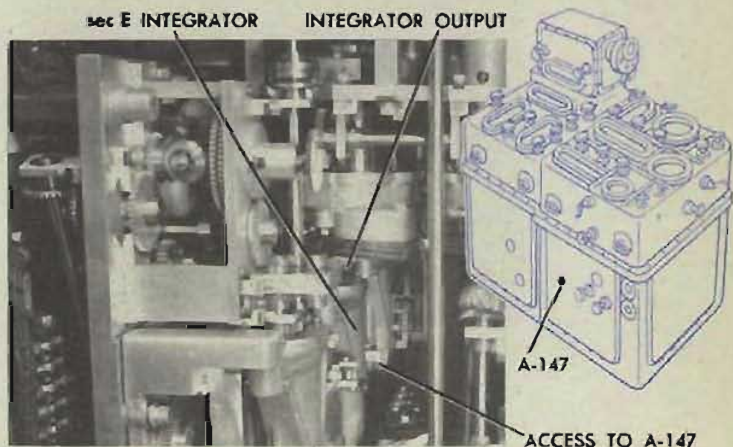
A-147 is under cover 3, 16 inches in, on the sec *E* integrator carriage.

A-147 is a vernier adjustment screw.

Check

Set *E* at 60° 49'. The sec *E* integrator carriage should be at the center of the disk.

Turn the power ON.
Turn the time motor ON.



There should be no integrator roller output while the disk is turning.

Adjustment

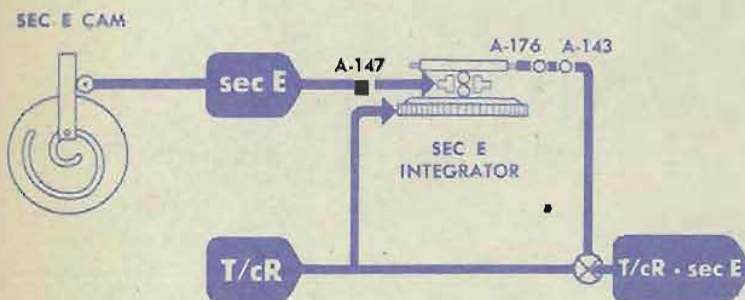
If there is any integrator roller output, loosen the locking screw and turn the A-147 vernier adjustment screw until there is no output.

Tighten the locking screw and re-check.

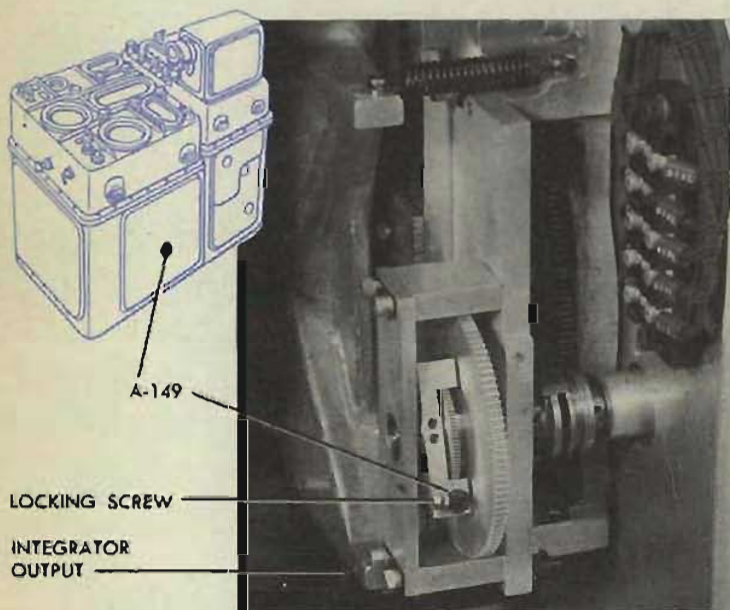
Note

This is a preliminary adjustment. To refine the adjustment, run the $T/cR \cdot sec E$ unit check test. See page 215.

Recheck by running the bearing B tests.



A-149 and 1/cR INTEGRATOR to 1/cR CAM A-150



Location

A-149 and A-150 are under cover 5, on the carriage input to the 1/cR integrator.

A-149 is the vernier adjustment screw. A-150 is the coarse adjustment clamp.

Note

A-150 is omitted on instruments with Ser. Nos. 221 and higher.

Check

Set cR at 2790 yards by turning the jR handcrank. The 1/cR integrator carriage should be at the center of the disk.

Turn the power ON.

Set dR at 0 with the handcrank IN. Turn the time motor ON.

There should be no integrator roller output while the disk is turning.

Adjustment

If there is any integrator roller output, loosen the locking screw and turn the A-149 vernier adjustment screw until there is no output. The integrator carriage is now at the center of the disk.

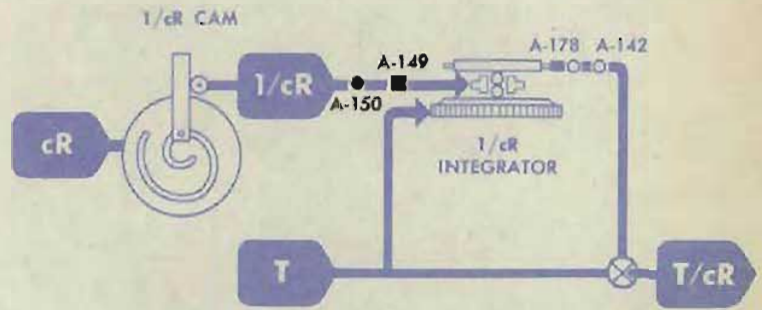
Tighten the locking screw and re-check.

In the older instruments which have A-150, check whether A-150 is loose. If A-150 is loose, push the integrator to the center of the disk, and tighten the clamp. Then adjust A-149.

Note

This is a preliminary adjustment. To refine the adjustment, run the *T/cR* unit check test. See page 212.

Recheck by running the elevation and bearing B tests.



A-151 and 1/cR CAM to cR DIALS A-152

Location

A-151 and A-152 are under cover 5, to the right of the *cR* intermittent drive.

A-151 is the vernier adjustment screw.
A-152 is the coarse adjustment clamp.

Check

Set *cR* above 1500 yards.

Decrease it steadily until the *1/cR* cam follower just ceases to move.

This is the start of the outer constant radius of the cam.

Motion of the follower can be observed on the three-inch spur gear toward the front of the *1/cR* cam.

The cam should be positioned so that further movement does not move the cam follower.

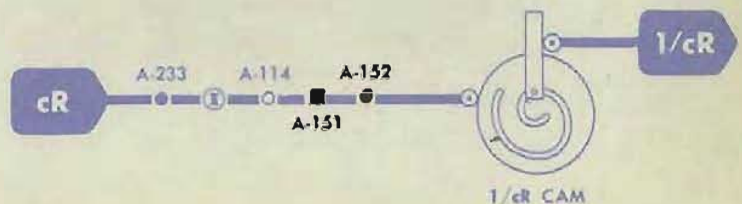
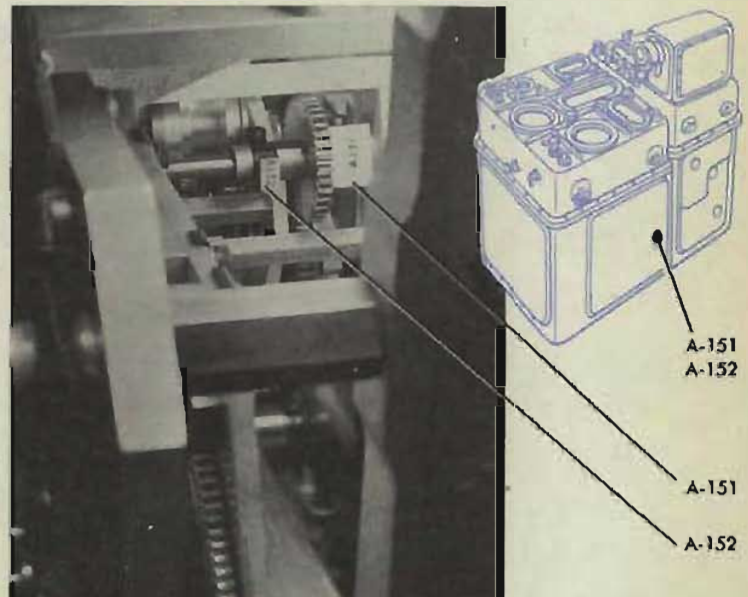
Note the reading of the *cR* dials.

Decrease *cR* to 0.

Increase *cR* steadily until the follower just starts to move.

Note the reading of the *cR* dials.

The average reading should be 1500 yards.



Adjustment

If the average reading of cR is not 1500 yards, check A-152. If it is loose, set cR at exactly 1500 yards and move the cam by hand until the follower just starts to move. Tighten A-152.

If A-152 is tight and the average reading is not 1500 yards, loosen the A-151 locking screw and turn the A-151 vernier adjustment screw until the average reading is correct. Then tighten the locking screw and recheck.

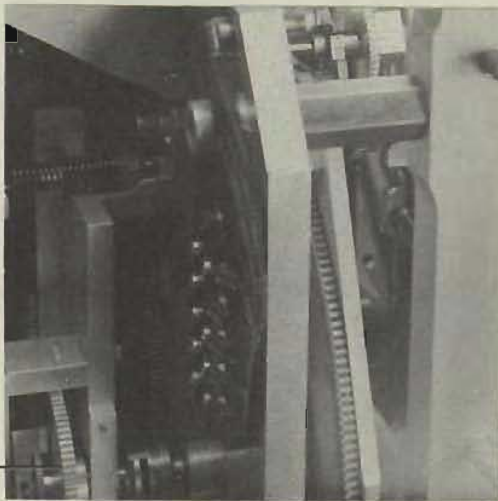
Check A-149.

Note

This is a preliminary adjustment. To refine the adjustment, run the T/cR unit check test. See page 212.

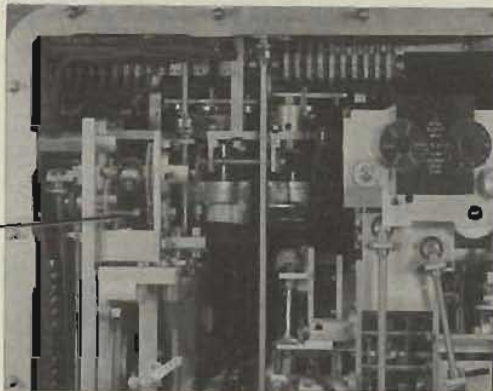
Recheck by running the bearing and elevation B tests.

SPUR GEAR



A-153 ASSEMBLY CLAMP

A-153

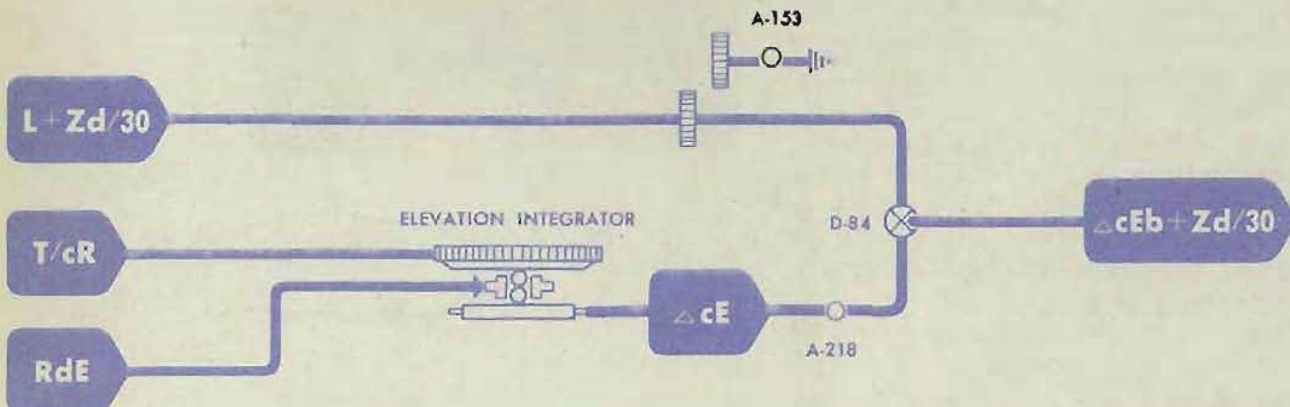


Location

A-153 is under cover 3, at the upper left.

Check

On all computers other than Mod 0, A-153 should be tightened *out of mesh*. On Mod 0 it should be tightened when the gear on which it is mounted is *in mesh* with D-84.



**A-154
and
A-155**

ELEVATION INTEGRATOR to RdE LINE

Location

A-154 and A-155 are under cover 3. A-154 is the vernier adjustment screw. A-155 is the coarse adjustment clamp.

Check

Turn the power ON.

Set dH , Sh , and So at 0 knots. The RdE line is now at its zero position.

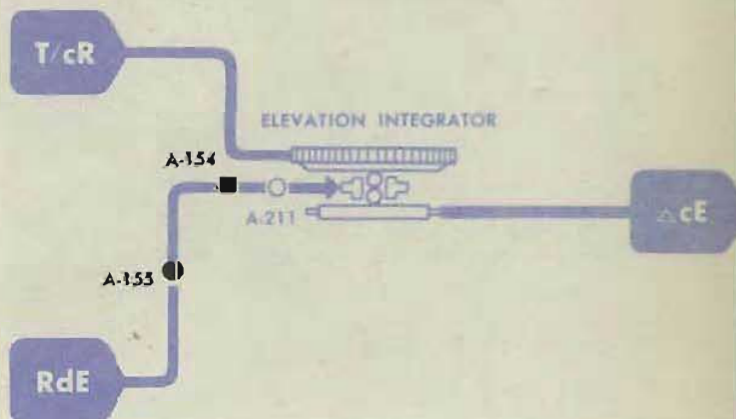
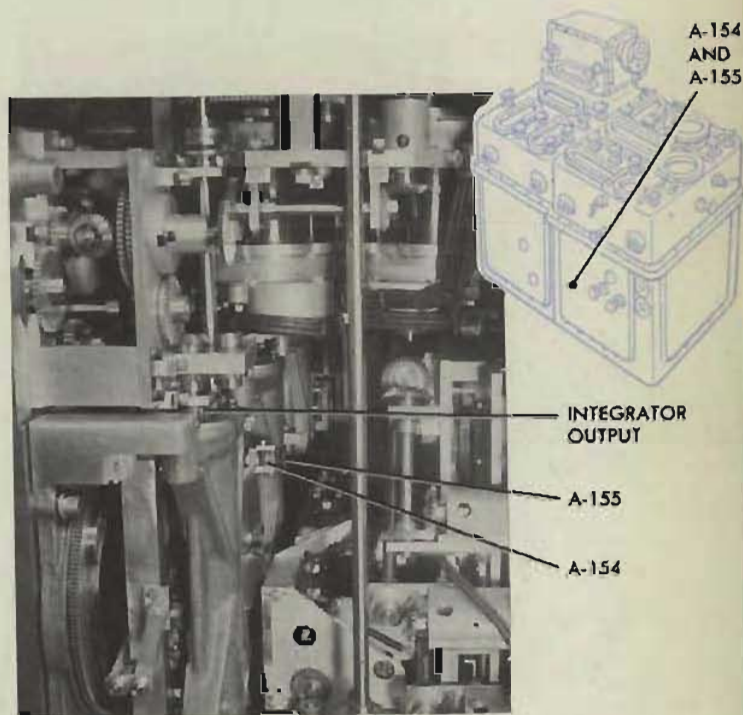
The elevation integrator carriage should be at the center of the disk. Set cR at 5000 yards. Turn the time motor ON. There should be no integrator roller output while the disk is turning.

Adjustment

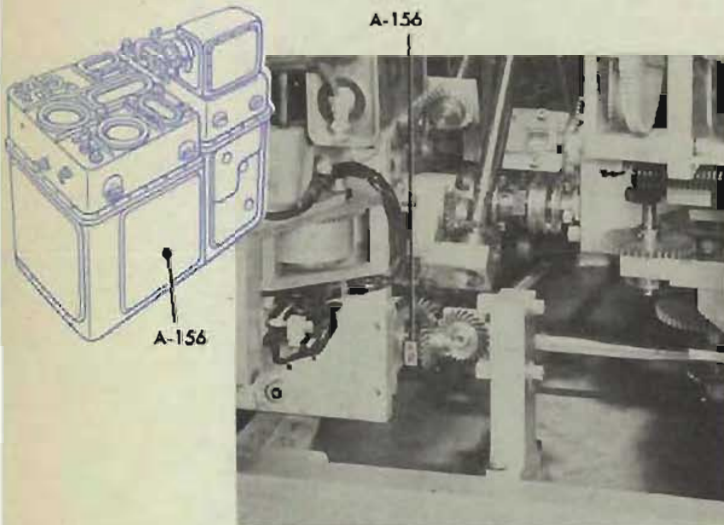
If there is any movement of the integrator output roller, loosen A-155, and push the carriage of the integrator to the approximate center of the disk. Tighten A-155. Then loosen the locking screw of A-154 and turn the vernier adjustment screw until there is no roller output.

Tighten the locking screw, and recheck by bringing dH on zero from both directions and splitting any error.

Recheck by running the elevation B tests.



A-156 PARALLAX COMPONENT SOLVER to R2 COUNTER



Location

A-156 is under cover 5, at the lower right of the R2 follow-up.

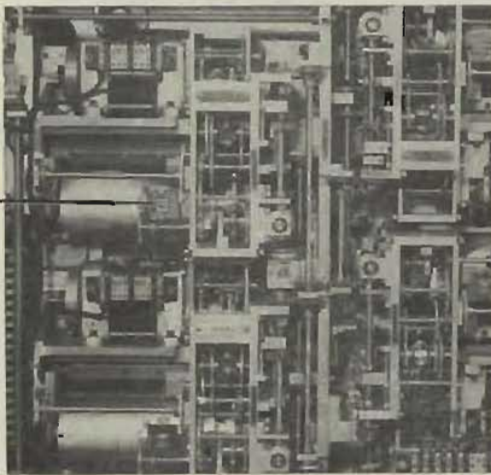
Check

Set $B'gr$ and $B'r$ at 90° .
Set $E2$ at 0° . Use the sync E hand-crank in the CENTER position.

Set L at 2000' on the computer dials.
Set the R2 counter of the Tf ballistic computer at 1560 yards and wedge the line.

The Ph dial should read $3^\circ 40'$ RIGHT.

R2 MASTER
COUNTER IN
 Tf BALLISTIC
COMPUTER



Adjustment

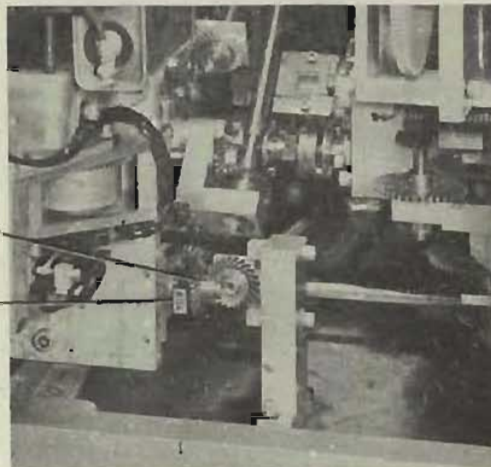
If the Ph dial does not read $3^\circ 40'$ RIGHT, make A-156 slip-tight. Slipping through A-156, turn the bevel gear at the right of the clamp until the dial reading is correct. Split any lost motion.

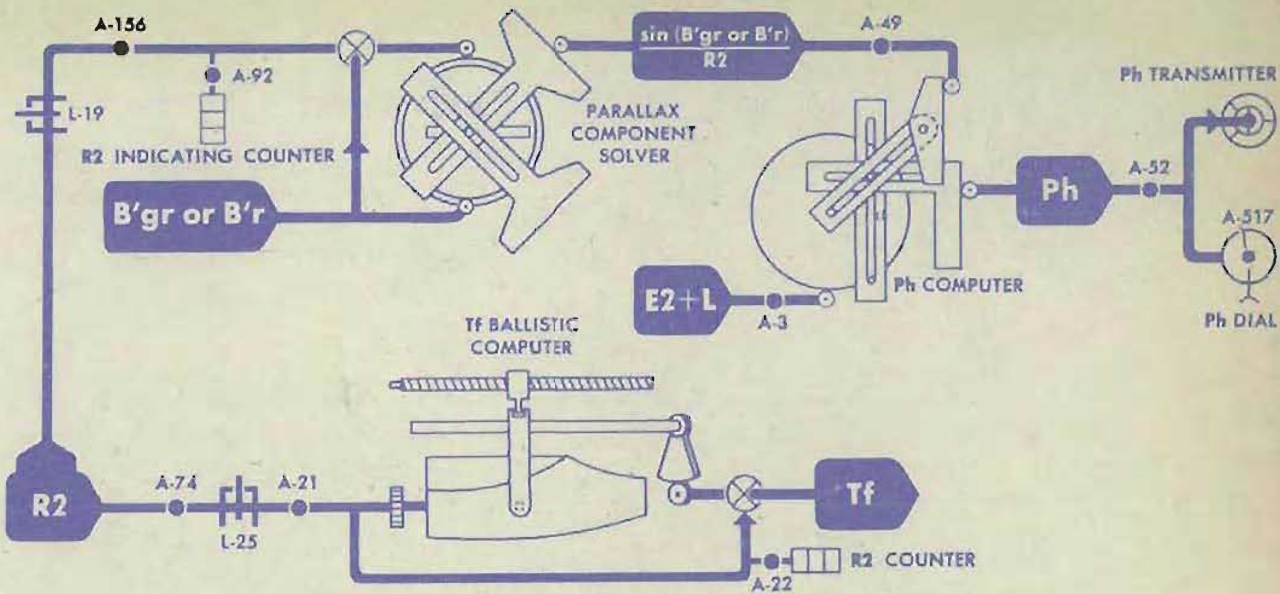
Tighten A-156, and recheck.
With $B'gr$ and $B'r$ at 270° , the Ph dial should read $3^\circ 40'$ LEFT.

Readjust A-3.
Remove wedges.
Readjust A-92.

BEVEL GEAR

A-156





A-156 R2 INTERMITTENT DRIVE to R2 COUNTER (Mods 8 and 12)

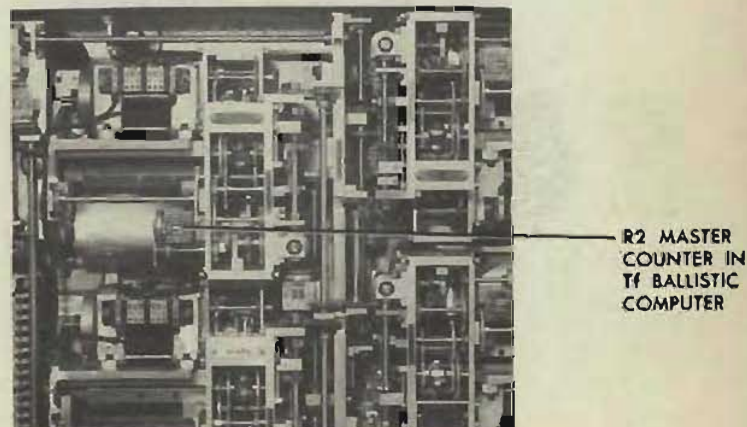
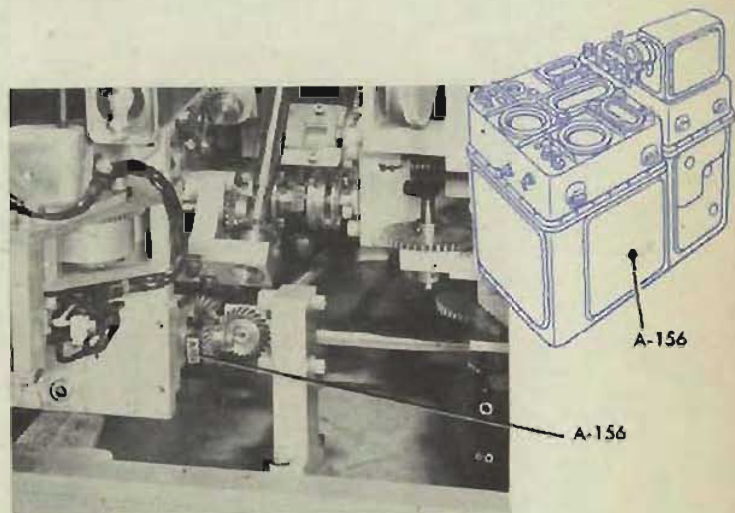
Location

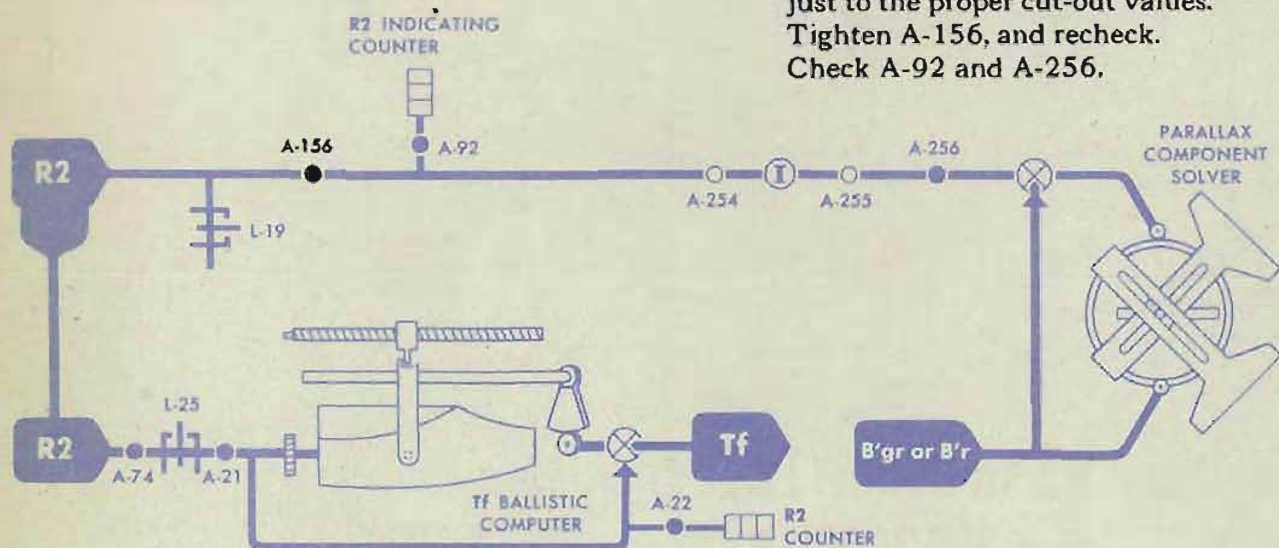
A-156 is under cover 5, at the lower right of the R2 follow-up.

The R2 intermittent drive is under cover 7, behind the left side of the lower right terminal block.

Check

The R2 intermittent drive should have its cut-out points at 1500 and 18,900 yards.

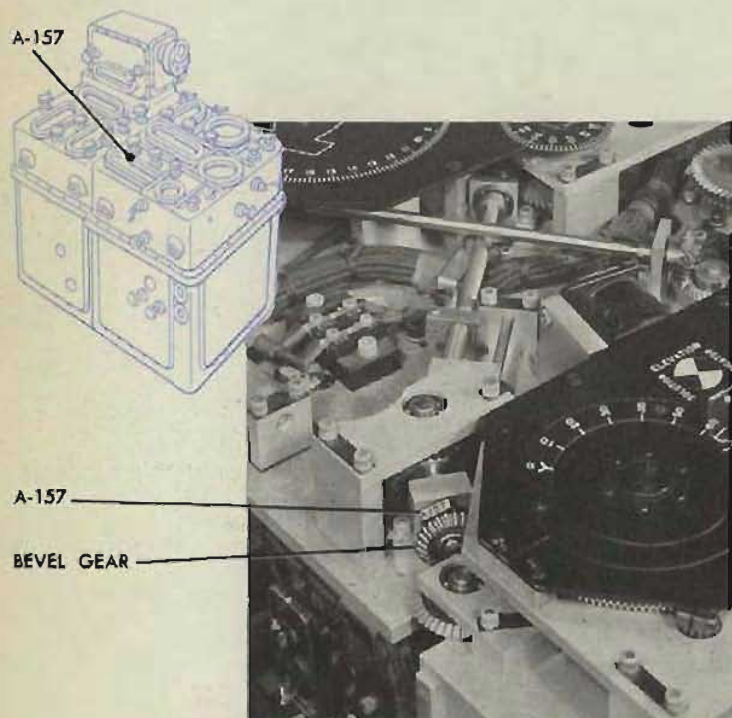




Adjustment

If the cut-out points are not 1500 and 18,900 yards, loosen A-156 and adjust to the proper cut-out values. Tighten A-156, and recheck. Check A-92 and A-256.

A-157 HORIZONTAL WIND COMPONENT SOLVER to Sw DIAL



Location

A-157 is under cover 1, to the left of the Sw input gear.

Check

Turn the power ON.

Set *B* at 0° .

Set *Ds* at 500 mils.

Set *Sw* at 0 knots.

Set *Bw* at 90° .

Mark the *Ywgr* follow-up output gearing for use as an indicator.

Turn the *Bw* input gear until *Bw* reads 0° .

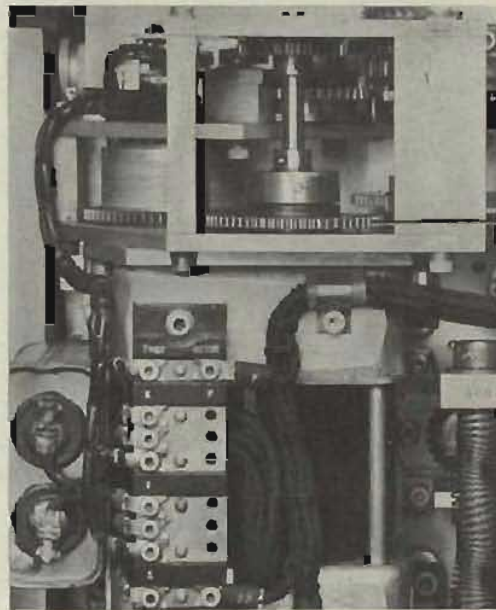
The output racks of the horizontal wind component solver should not move.

Movement of the Y_{wg} output rack can be checked by observing the marks on the Y_{wgr} follow-up output gear.

Adjustment

If there is any output, make A-157 slip-tight.
 Set Sw at 0 knots, and Bw at 0 .
 Turn the bevel gear at the rear of the clamp until the Y_{wg} indicating marks match.

Tighten A-157.

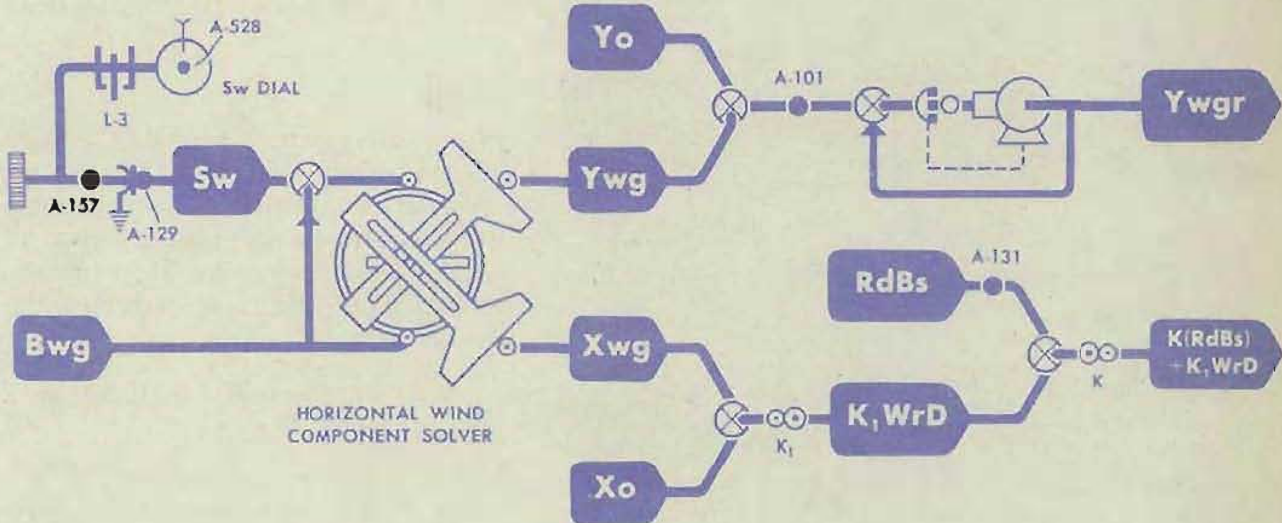


Y_{wgr}
 FOLLOW-UP
 OUTPUT GEAR

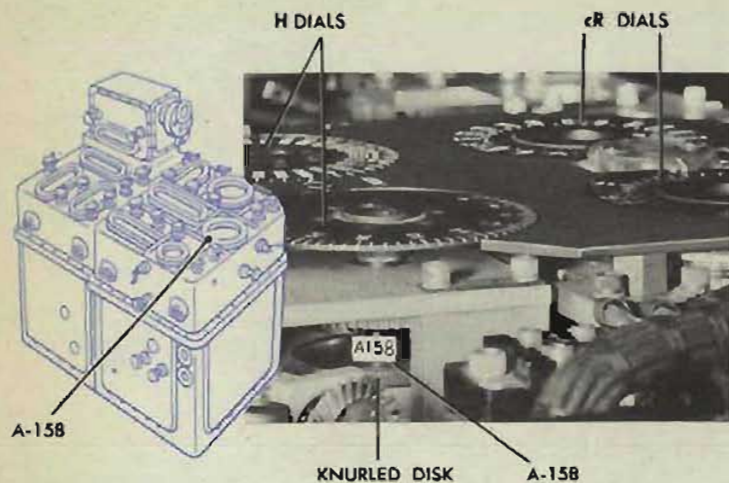
Recheck

Set Sw at 0 knots.
 Turn Bw through 360 .
 The output gearing of the Y_{wgr} follow-up should not move more than one tooth.

Check A-101, A-131 and A-229.



A-158 TAKE-UP SPRING ON HEIGHT LINE



Location

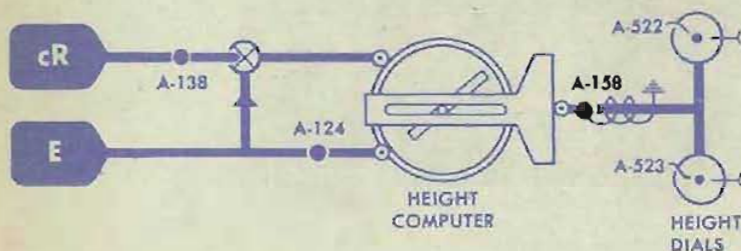
A-158 is under cover 1, below the coarse *H* dial.

The spring should always have sufficient tension to remove the lost motion from the mechanisms driving the *H* dials.

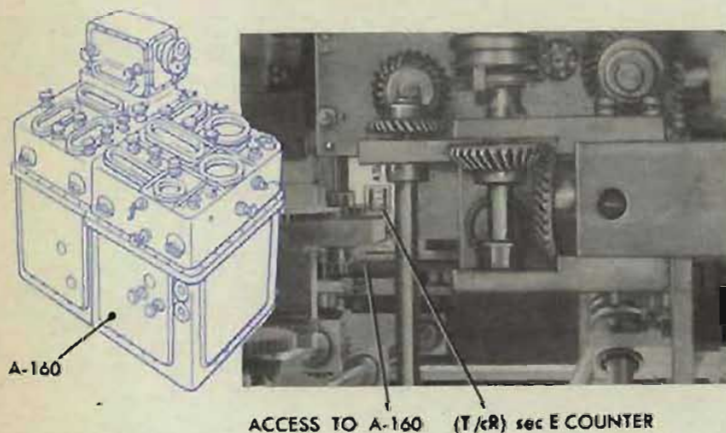
Adjustment

Set *E* at its lower limit.
 Set *cR* at its upper limit.
 Slip-tighten A-158. Turn the knurled disk below the clamp clockwise until the spring is fully wound.
 Tighten A-158.

Check A-522, A-523, and A-124.



A-160 ASSEMBLY CLAMP



Location

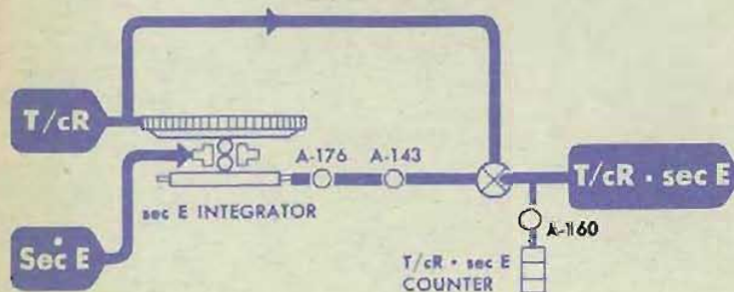
A-160 is under cover 3, on the gear meshing with the (*T/cR*) sec *E* counter. On later instruments, the gear on which A-160 is mounted may be slid out of mesh with the counter gear.

Check

If a sliding gear is provided, A-160 should be tightened with the gear out of mesh except while timing the integrators. Then it must be tightened in mesh. On the earlier instruments, A-160 should be tightened with the gears meshed.

Adjustment

Readjust A-160 according to the check. No further adjustment is necessary.



A-161 FRICTION DRIVE ON TIME MOTOR REGULATOR

Location

A-161 is under cover 1, at the right front, on the input gear of the time motor regulator.

Check

Turn the power OFF.

Disconnect leads TM2 and TMR from the regulator, loosen the three screws holding the unit, and remove it from the computer.

Check the friction by turning the input gear. The friction should be tight enough to drive the regulator when the gear is turned counterclockwise as viewed from the bottom. It should be loose enough, however, to slip easily when the gear is turned in the opposite direction.

Adjustment

If the friction is not adjusted properly, loosen A-161 and turn the clamp to vary the friction as required.

Tighten the screw and recheck.

Replace the regulator in the computer, and check that the gears mesh properly and that the regulator input gear has sufficient side clearance.

CAUTION

If this friction is too tight, turning the time crank counterclockwise in the OUT position will damage the regulator mechanism.

A-162 TIME FRICTION DRIVE

Note

A-162 does not exist on instruments with Ser. Nos. 101 and higher. A-162 was made inoperative on Ser. Nos. 100 and lower by OD 4185.

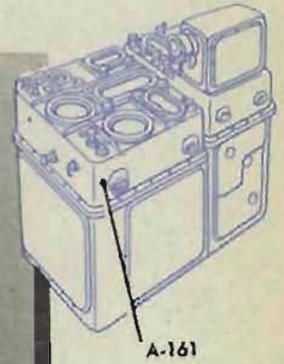
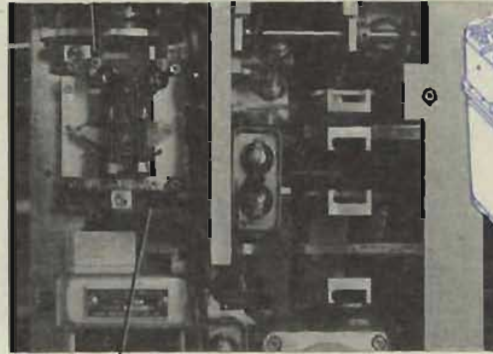
Location

A-162 is under cover 1, at the front.

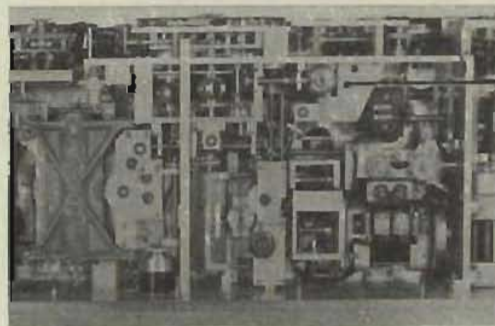
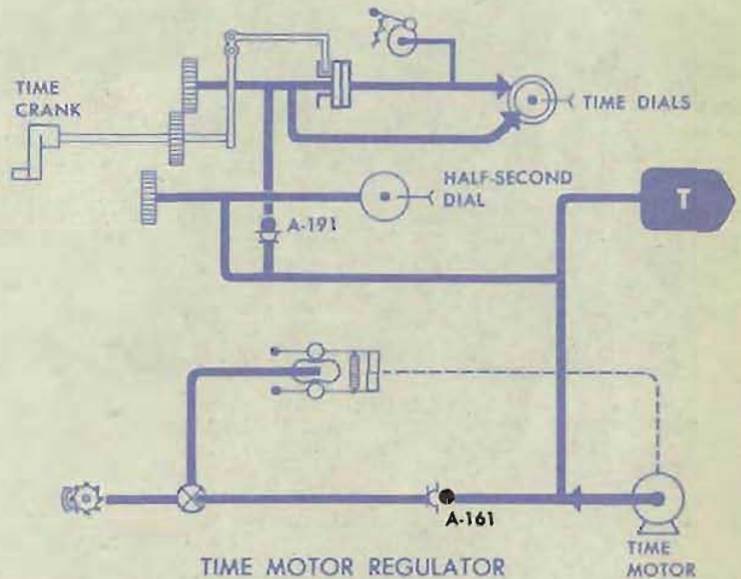
Adjustment

Tighten the screw on A-162, leaving the friction loose.

TIME MOTOR REGULATOR

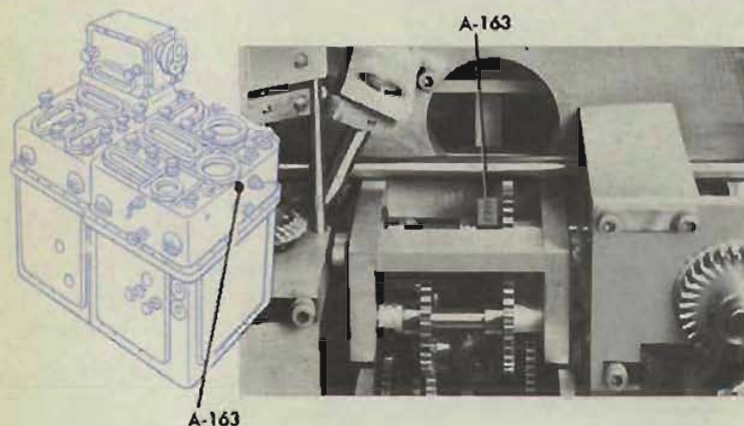


A-161



ACCESS TO A-162

A-163 SYNCHRONIZING THE dR FOLLOW-UP



Location

A-163 is under cover 1, on the input gearing of the *dR* follow-up.

CAUTION

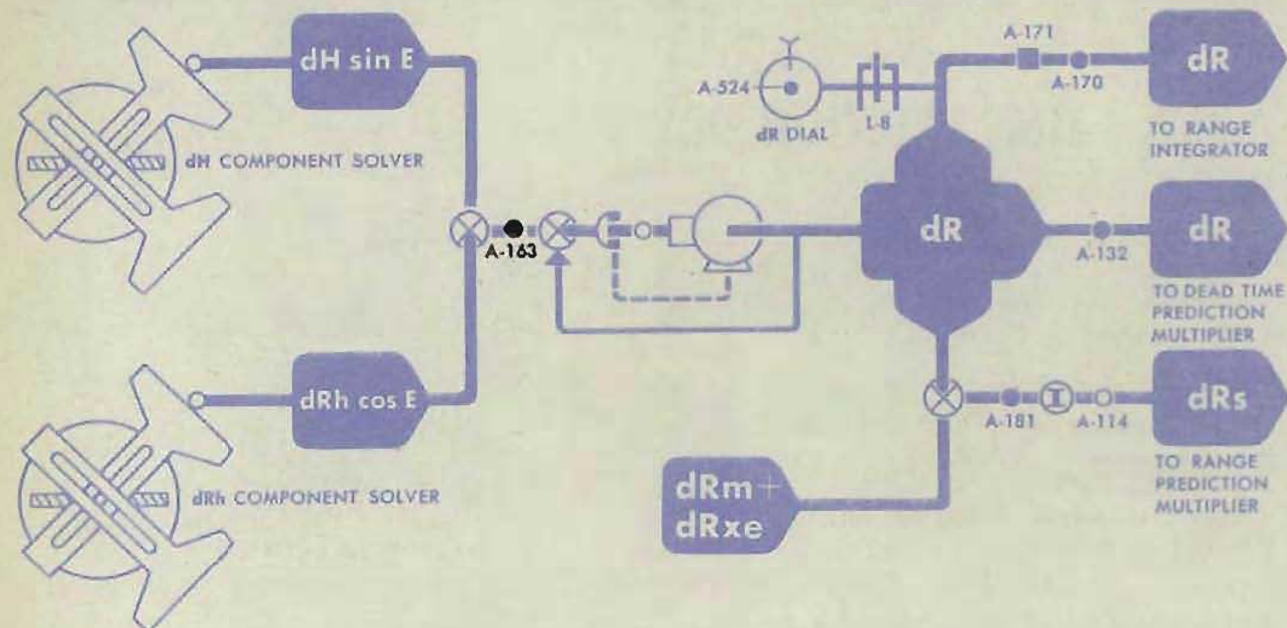
With the power OFF, turn the *dR* follow-up output manually from limit to limit. If any restriction is felt, A-170, A-132, or A-135 may be up-set. Determine the cause of the restriction, and loosen the clamp causing it.

Check

- Remove the KRR lead on the target angle switch.
- Turn the power ON.
- Set *So*, *Sh*, and *dH* at 0 knots.
- Set *Br* at 270°.
- Set *A* at 90°.
- Wedge all lines.
- The *dR* dial should read 0 knots.

Adjustment

- If the *dR* dial does not read 0 knots, slip-tighten A-163. Turn the spur gear to the right of A-163 until the follow-up motor synchronizes with the *dR* dial at 0 knots.
- Tighten A-163, and recheck.
- Remove all wedges. Replace the KRR lead.
- Readjust any loosened clamps.
- Check A-171, A-132, and A-181.



A-164 *jdR* HOLDING FRICTION

Location

A-164 is located under cover 1, at the front center.

Check

This friction should be tight enough to prevent *jdR* from backing out *jdR*, but not so tight as to overload the *jdR* motor during automatic range transmission.

Put the range correction integrator carriage in its uppermost position and wedge the range rate ratio line.

Turn *jdR* to decrease *cR* to 0 yards.

The *jdR* friction should hold the *jdR* line motionless.

Run the synchronizing test of the range receiver, page 62.

Check that the *jdR* motor drives fast enough to synchronize within the prescribed time limit.

Adjustment

If both conditions under the check are not obtained, loosen A-164.

If the *jdR* line backs out, turn the clamp clockwise to increase the friction.

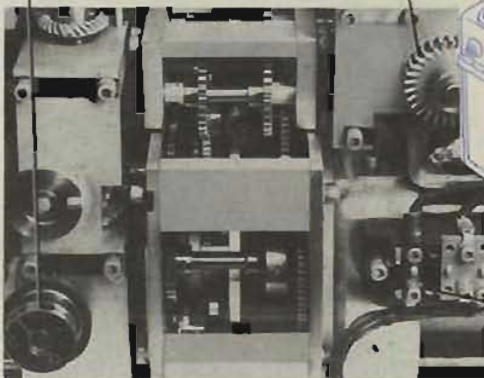
If the *jdR* motor drives too slowly, turn the clamp counterclockwise to decrease the friction.

Tighten A-164 and recheck.

Check A-240.

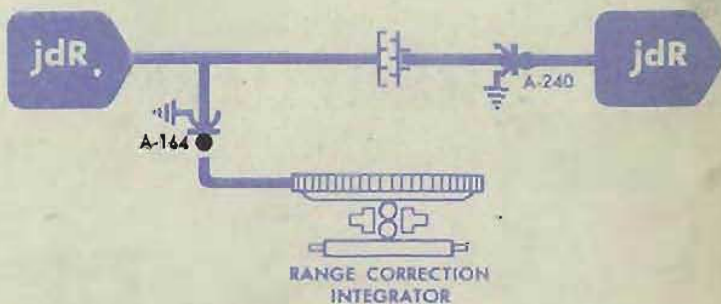
A-164

jdR INPUT GEAR



jdR MOTOR

A-164



A-165 SPRING ON L-13

Note

A-165 does not exist on instruments with Ser. Nos. 101 and higher.

Location

A-165 is under cover 1, at the front.

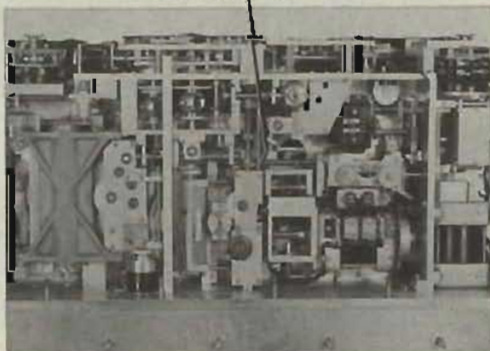
Check

A-165 should be tight enough to hold L-13 at the lower limit.

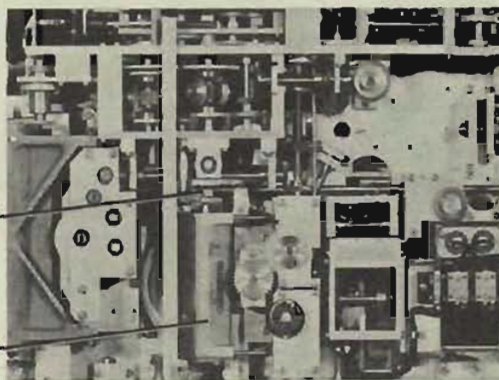
Adjustment

If A-165 does not hold L-13 at the lower limit, loosen the screw. Turn the clamp clockwise to tighten the spring. Tighten the screw and recheck.

A-165 (AT LOWER END OF L-13)



A-166 ASSEMBLY CLAMP



A-166

RANGE CORRECTION INTEGRATOR

Location

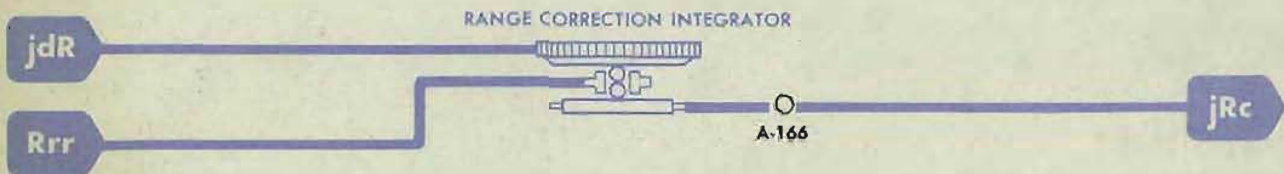
A-166 is under cover 1, at the front, on the output gear of the range correction integrator.

Check

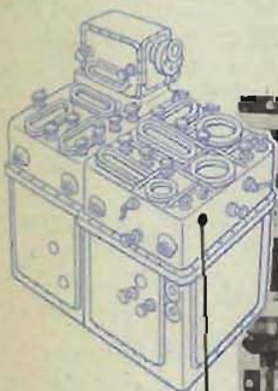
A-166 should be tight.

Adjustment

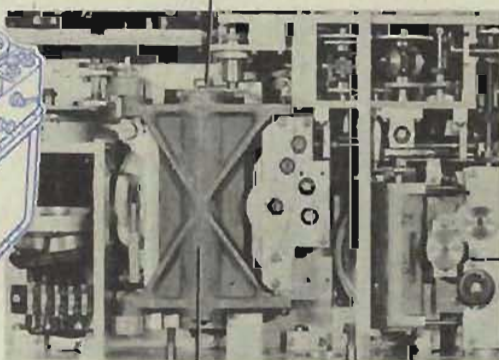
Tighten A-166. No further adjustment is necessary.



A-167 ASSEMBLY CLAMP



A-167



RANGE INTEGRATOR

Location

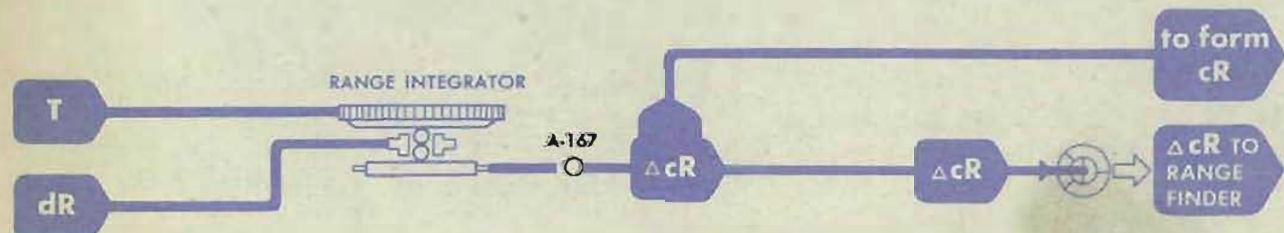
A-167 is under cover 1, at the front, on the output gear of the range integrator.

Check

A-167 should be tight.

Adjustment

Tighten A-167. No further adjustment is necessary.



A-168 ASSEMBLY CLAMP

Location

A-168 is under cover 1, at the right front, on the pinion of the *jdR* motor. It can be reached only by removing the motor.

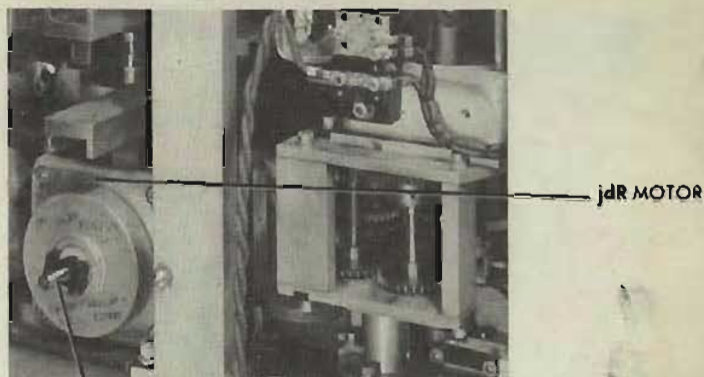
Check

If A-168 is loose, the energized servo may drive indefinitely, without turning the range line.

Adjustment

To remove the *jdR* servo motor, consult the section in this OP on removal of units.

Tighten A-168, and reinstall the *jdR* servo motor. No further adjustment is necessary.



A-168 AT OTHER END OF THIS MOTOR SHAFT



A-170 and A-171 RANGE INTEGRATOR to dR LINE

Location

A-170 and A-171 are under cover 1, behind the mounting plate to the right of the *dR* integrator.

A-170 is the coarse adjustment clamp.
A-171 is the vernier adjustment.

Check

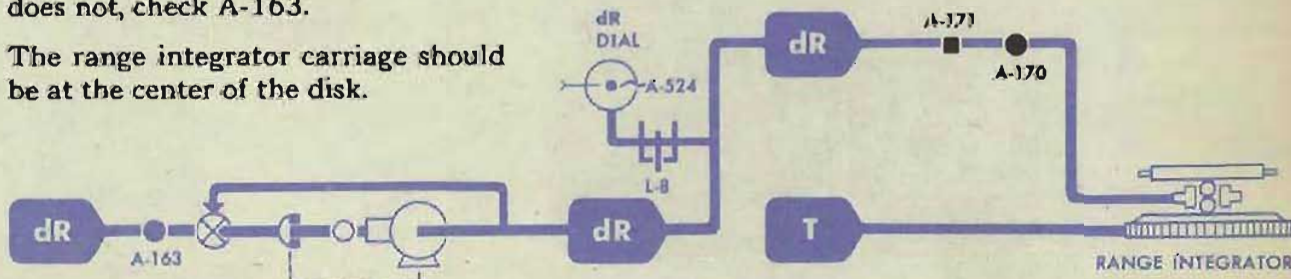
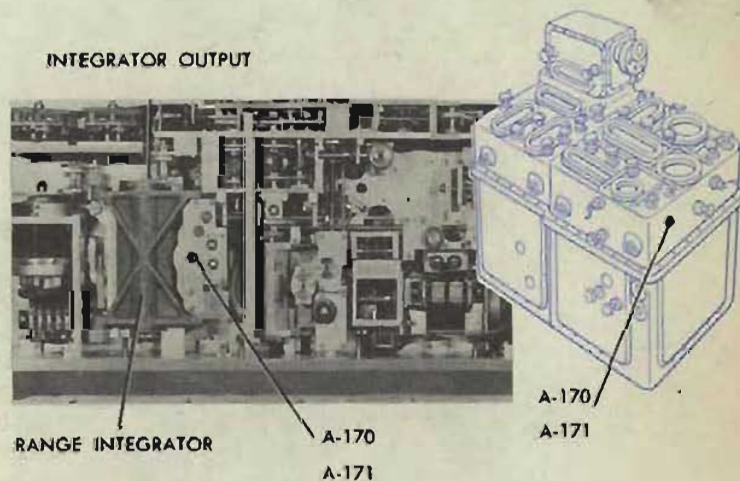
Set *S_o*, *S_h*, and *dH* at 0 knots and wedge the lines.

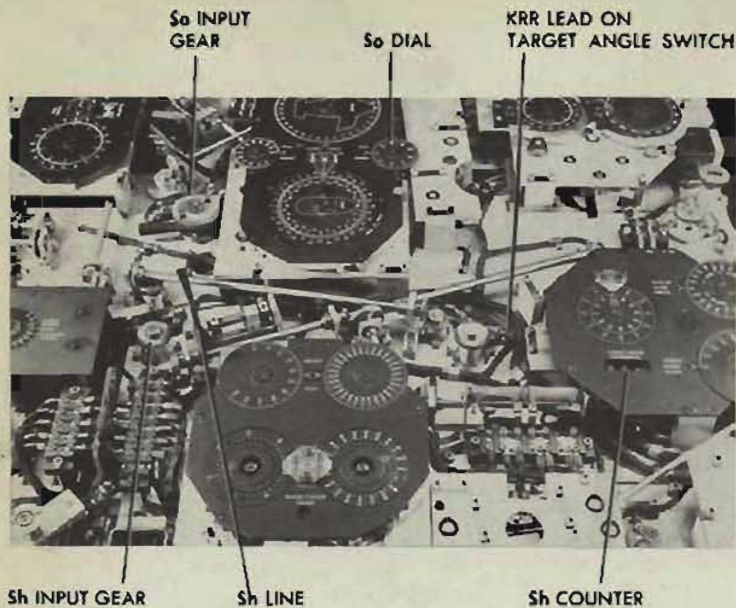
Remove the KRR lead on the target angle switch.

Turn the power ON.

The *dR* line is now at its zero position, and the *dR* dial should read 0. If it does not, check A-163.

The range integrator carriage should be at the center of the disk.





Turn the time motor ON. There should be no output on the range integrator roller while the disk is turning.

Adjustment

If there is any movement of the integrator roller, first check A-170. If it is loose, push the integrator carriage to the approximate center of the disk, and tighten A-170. Then loosen the locking screw on A-171 and turn the vernier adjustment screw until there is no output from the range integrator.

Tighten the locking screw and recheck.

Turn the time motor OFF. Remove the wedges. Replace the KRR lead.

Recheck by running the range B tests.

A-172 and A-173 RANGE CORRECTION INTEGRATOR to Rrr LINE

Location

A-172 and A-173 are under cover 1, at the front, on the carriage of the range correction integrator.

A-172 is the coarse adjustment clamp. A-173 is the vernier adjustment.

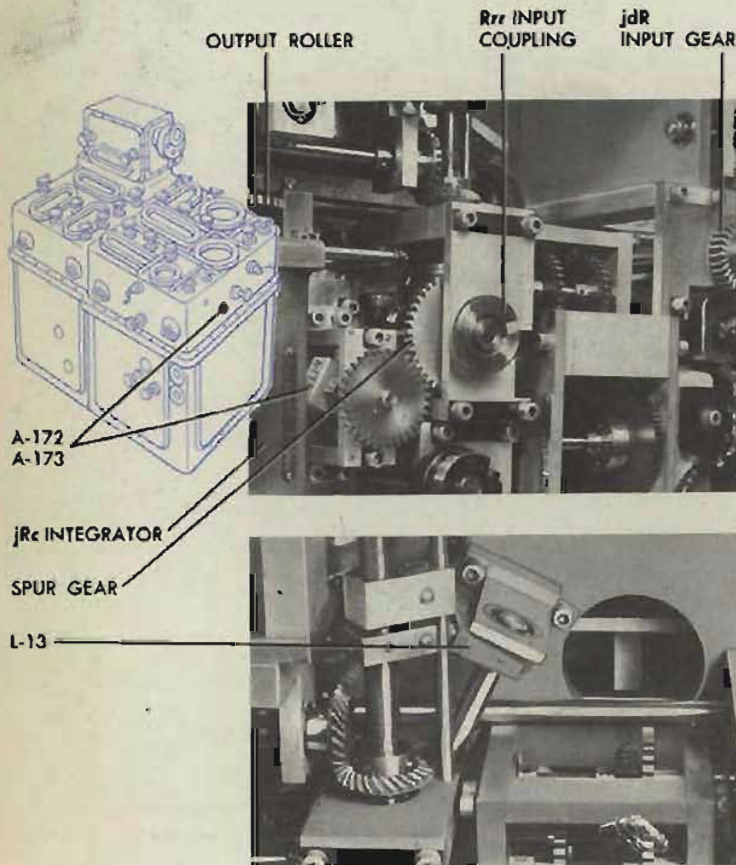
Limit stop L-13 is under cover 1, at the front. It consists of a metal block screwed to an arm. The arm is pinned to the upper end of a diagonal shaft on the range rate ratio input line. The shaft is to the left of the *dR* follow-up.

Check

This adjustment can be checked only with the range correction integrator carriage at its zero position. The block on the arm of the limit stop must be removed because it offsets the carriage from the zero position. Remove the block.

Turn the large spur gear behind the *Rrr* knob coupling to bring the arm to its lower limit. The lower limit of the arm is to the left.

The integrator carriage should be at the center of the disk. Rapid turning of the *jdR* input gear should produce no motion of the output roller.

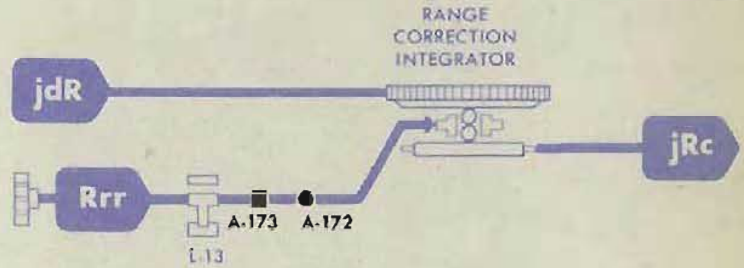


Adjustment

If there is any output from the integrator roller, the carriage is not at the center of the disk. Check whether A-172 is loose. If it is loose, push the integrator carriage to the center.

Tighten A-172.

Loosen the locking screw on A-173. Turn the vernier adjustment screw until there is no movement of the output roller when *jdR* is turned.



REMINDER

Tighten the vernier locking screw.

Replace the block on the stop arm, so that the integrator carriage cannot go to the zero position.

A-174 R_j HOLDING FRICTION

Location

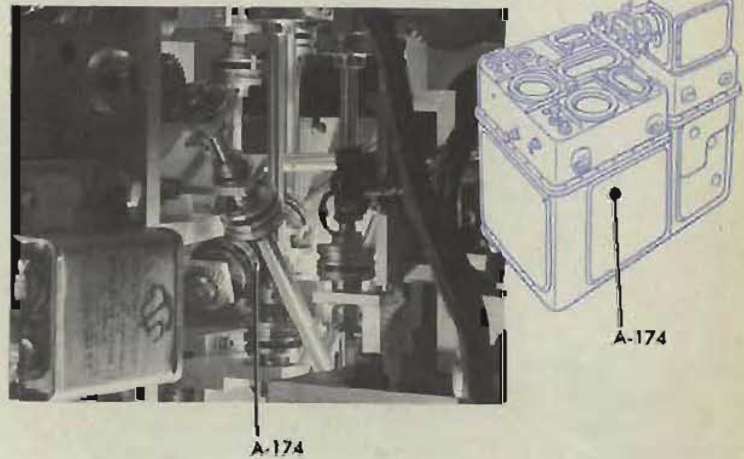
A-174 is under cover 5, on a diagonal shaft.

Check

This friction should be tight enough to hold the *R_j* setting, but not so tight as to overload the *R_j* receiver motor.

Turn the generated range crank in the OUT position. *cR* should not back through the *R_j* line.

Run the *R_j* receiver synchronizing test, page 62. Check that the synchronizing time is within the allowable limits.



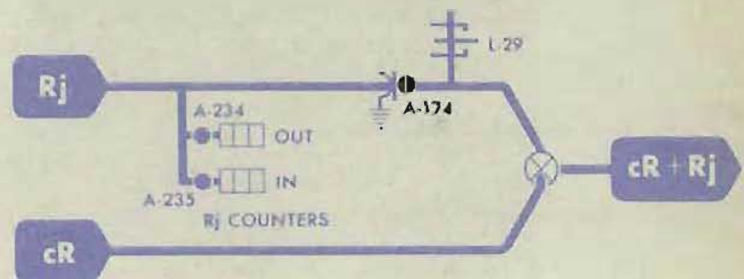
Adjustment

If both conditions under the check are not obtained, loosen A-174.

If the *R_j* line backs out, turn the clamp clockwise to increase the friction.

If the *R_j* receiver synchronizes too slowly, turn the clamp counterclockwise to decrease the friction.

Tighten A-174 and recheck.



A-175 ASSEMBLY CLAMP



Location

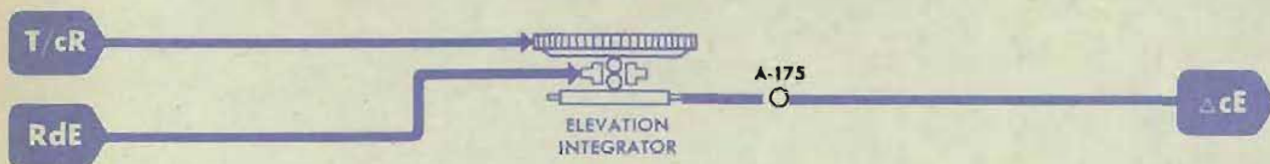
A-175 is under cover 3, on the output gear of the elevation integrator.

Check

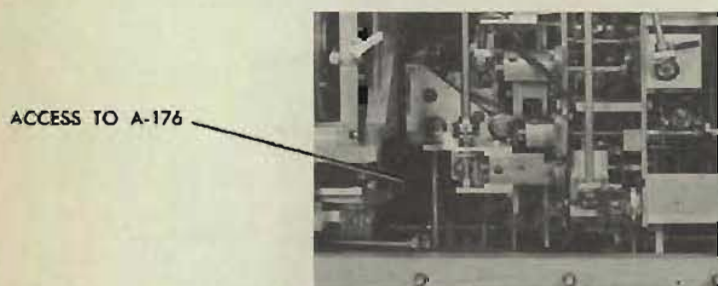
A-175 should be tight.

Adjustment

Tighten A-175. No further adjustment is necessary.



A-176 ASSEMBLY CLAMP



(INTEGRATOR ASSEMBLY REMOVED FROM INSTRUMENT)

Location

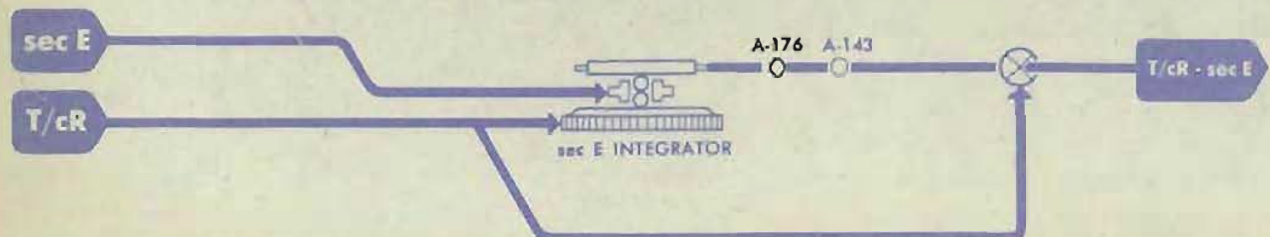
A-176 is under cover 3, on the output coupling of the sec *E* integrator.

Check

A-176 should be tight, and the coupling should be properly engaged.

Adjustment

Tighten A-176. No further adjustment is necessary.



A-177 ASSEMBLY CLAMP

Location

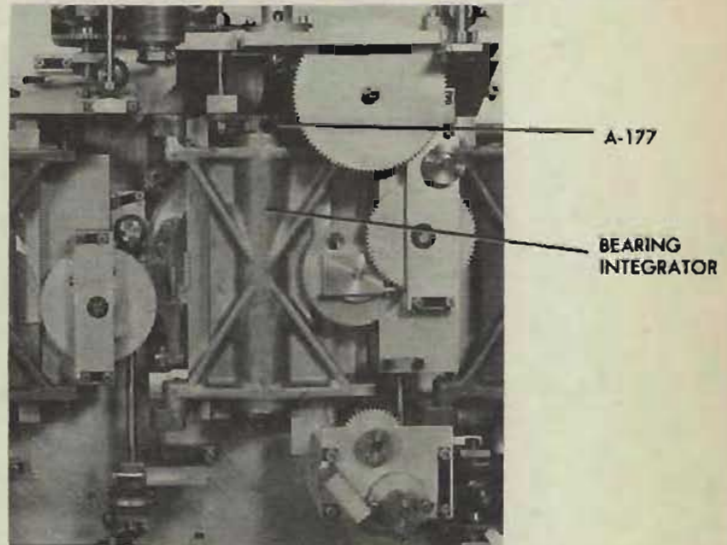
A-177 is under cover 3, on the output gear of the bearing integrator.

Check

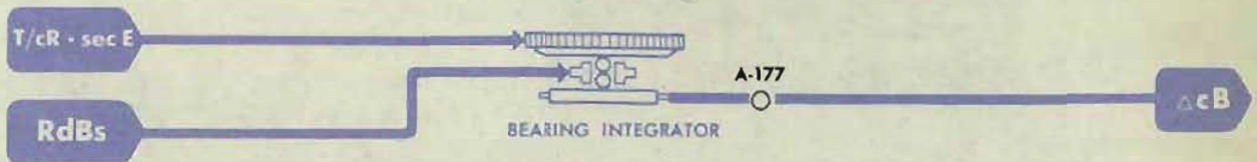
A-177 should be tight.

Adjustment

Tighten A-177. No further adjustment is necessary.



(INTEGRATOR ASSEMBLY REMOVED FROM INSTRUMENT)



A-178 ASSEMBLY CLAMP

Location

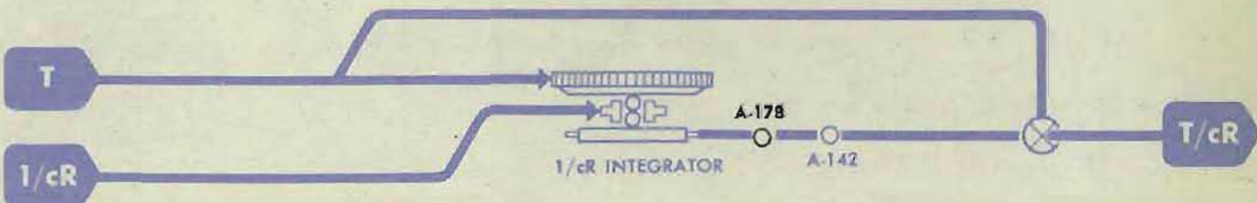
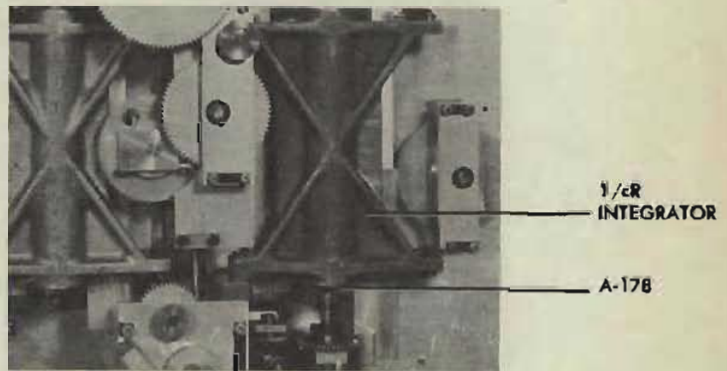
A-178 is under cover 5, on the output coupling of the 1/cR integrator.

Check

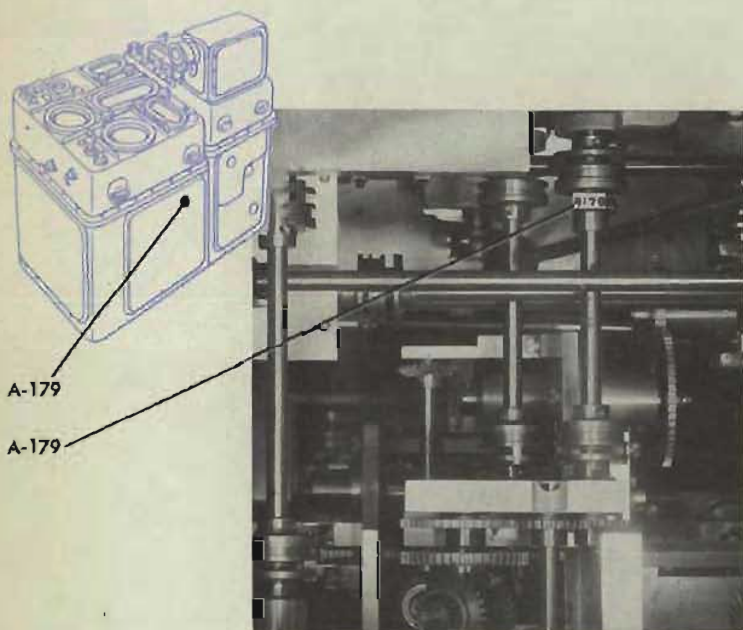
A-178 should be tight and the coupling should be properly engaged.

Adjustment

Tighten A-178. No further adjustment is necessary.



A-179 SHIP DIAL to Co RECEIVER



Location

A-179 is under cover 5, in the upper rear of the front section, below the coupling on a vertical shaft to the control unit.

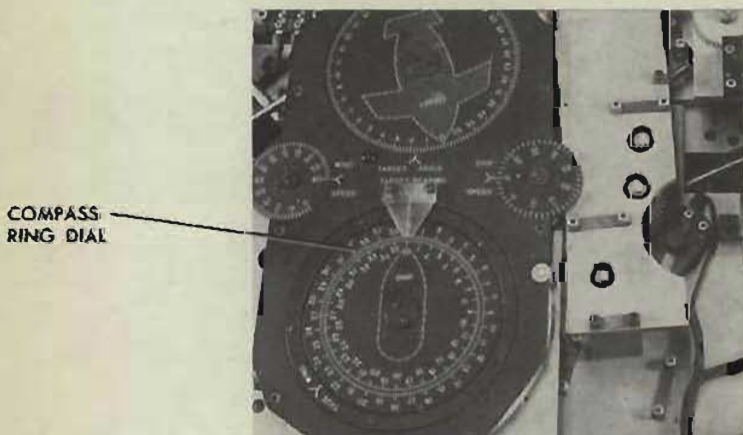
Check

Turn the power ON.

Put the Co handcrank in its OUT position.

Transmit Co from the gyro compass to the computer.

The reading of the ship dial against the compass ring dial should agree with the gyro compass reading.

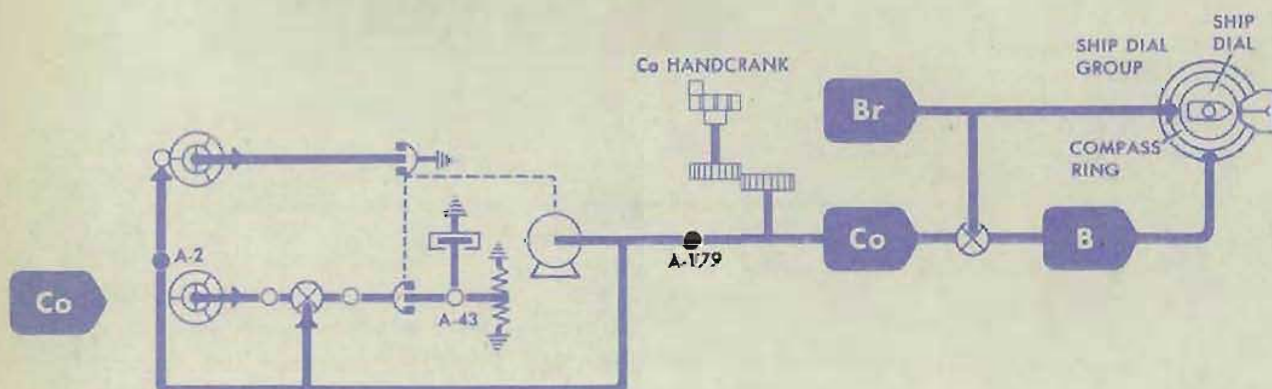


Adjustment

If the computer dial reading does not agree with the gyro compass reading, loosen A-179. Put the Co handcrank in its IN position and bring the compass ring dial to its correct value.

Return the Co handcrank to its OUT position.

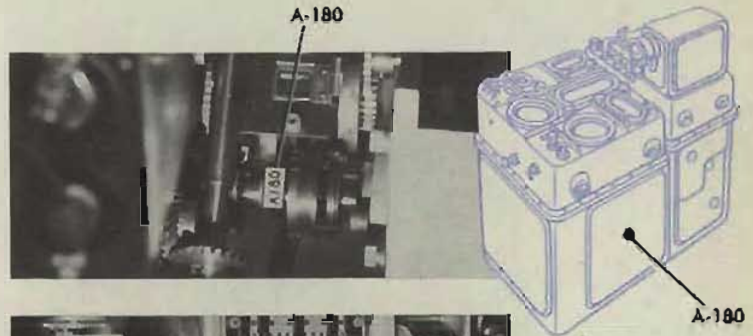
Tighten A-179 and recheck.



A-180 E2 MASTER COUNTER to E DIALS

Location

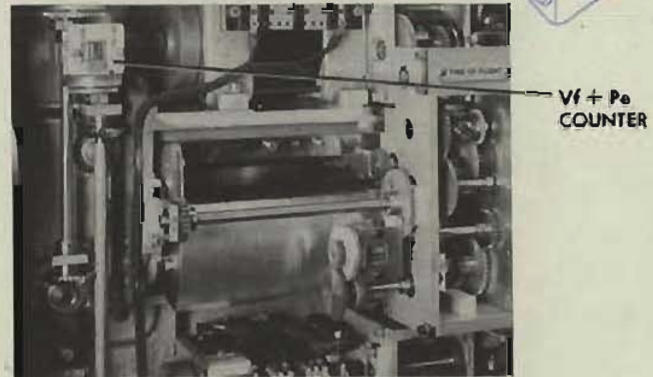
A-180 is under cover 5, at the lower center, between two couplings.



Check

Turn the power OFF.

Set $Vf + Pe$ at 0' by turning the gearing to the $Vf + Pe$ counter at the upper left under cover 4, and wedge the line.



Set $I.V.$ at 2550 f.s., and Vs at 2000'.

Set the E dials at 1°.

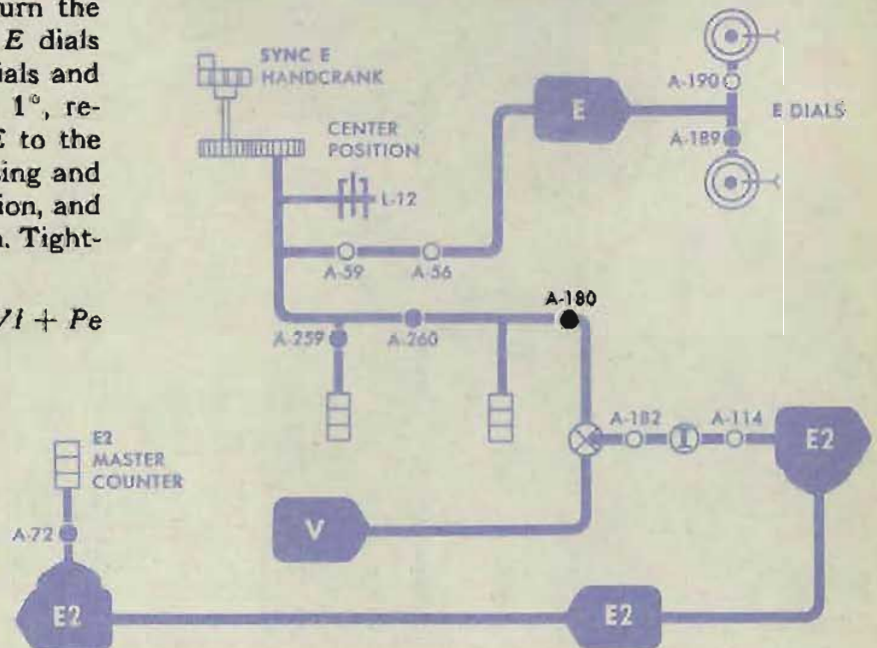
The $E2$ master counter under cover 4 should read 1°, the same as the E dials.

Adjustment

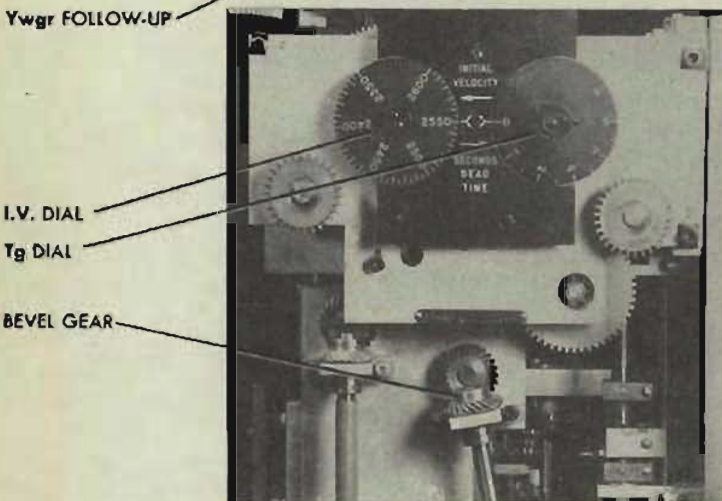
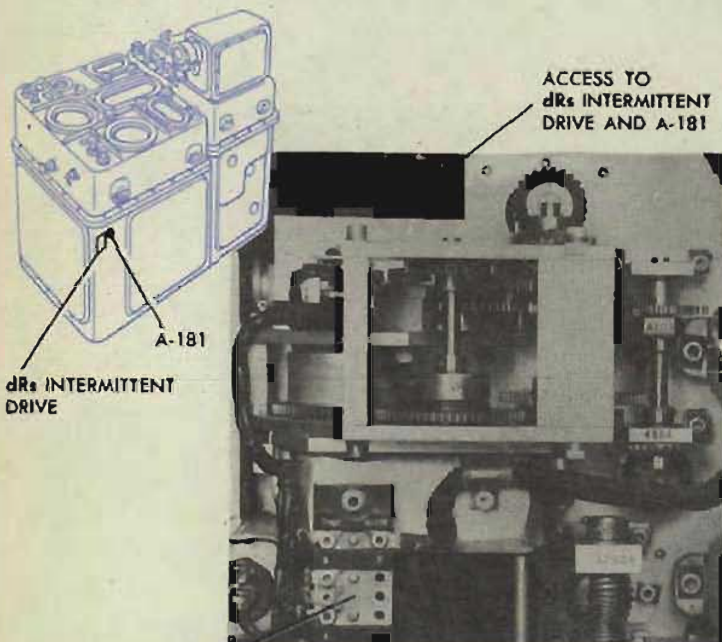
If the $E2$ counter does not read the same as the E dials, make A-180 slip-tight. Turn the sync E handcrank in its CENTER position until $E2$ reads 1°. Wedge the $E2$ line at the gearing to the $E2$ master counter. Turn the sync E handcrank until the E dials read 1°. When both the E dials and the $E2$ master counter read 1°, remove the $E2$ wedge, bring E to the correct value from an increasing and then from a decreasing direction, and read $E2$. Split any lost motion. Tighten A-180, and recheck.



Remove the wedge from the $Vf + Pe$ line.



A-181 dRs INTERMITTENT DRIVE to dRs LINE



Location

A-181 is under cover 5, on the input to the *dRs* intermittent drive.

Check

Turn the power ON.

Set *So*, *Sh*, and *dH* at 0 knots.
Set *I.V.* at 2550 f.s.

Decrease *dR*. Use the *dR* handcrank in the HAND position.
Observe the output gear of the *dRs* intermittent drive or the bevel gear at the top of the six-inch shaft below the *Tg* dial. These gears should turn until the *dR* dial reads -450 knots.

The intermittent drive should then be at its low cut-out point. Since the limit stop of the *dR* line also acts at -450 knots, the adjustment of A-181 cannot be accurately checked by changing *dR* alone.

Set *dR* at -450 knots.
Increase *I.V.* from 2350 until the intermittent drive cuts out. Note the reading on the *I.V.* dial.
Decrease *I.V.* from 2600 until the intermittent drive cuts in. Read the *I.V.* dial.

The average of the two readings should be 2550 f.s.
Check that A-114 is tight.

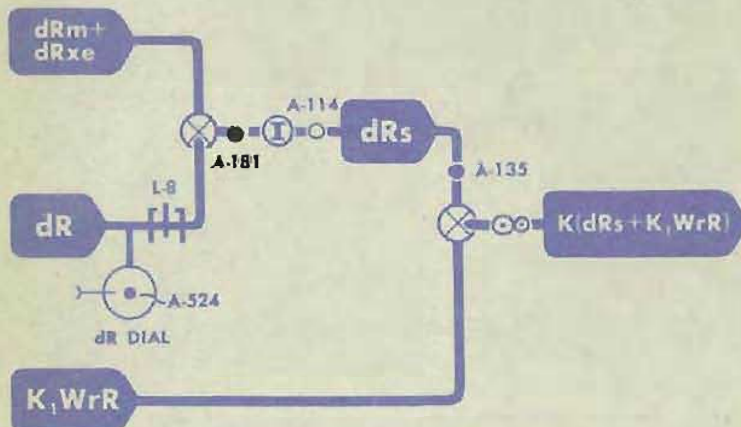
Adjustment

If it is necessary to readjust A-181, slip-tighten A-135 before attempting any adjustment.

If the average of the two *I.V.* readings is not 2550 f.s., make A-181 slip-tight.

CAUTION

Do not loosen A-181 all the way because the clamp gear may slip off the shaft of the intermittent drive.



Use the *I.V.* input to find the cut-out point of the intermittent drive.

Hold the large gear in the intermittent drive, with a gear pusher inserted through the access in the plate above the *Ywgr* follow-up, and turn *I.V.* to 2550 f.s.

Tighten A-181 and recheck.

If the intermittent drive is too far out of adjustment to refine with *I.V.*, decrease *dR* from 0 until the approximate cut-out point is found. Hold the large gear in the intermittent drive and bring *dR* back to -450. Then refine with *I.V.* as described above.

Check the upper cut-out point as follows: Run the *dR* line to the upper limit. The intermittent drive output should continue turning until *dR* reaches +450 knots. Decrease, then increase, *I.V.* through 2550 and read the *I.V.* dial at the cut-out and cut-in points, respectively. The average of the two readings should be 2550 f.s.

Readjust A-135.

Check A-104. On instruments with Ser. Nos. 781 and higher, also check A-132.

A-182 ASSEMBLY CLAMP

Location

A-182 is under cover 5, on the *E2* intermittent drive input gear, behind the follow-up mounting plate, at the lower front corner. It cannot be reached without removing the mounting plate.

Check

If A-182 has slipped, *E* will no longer match *E2*. Check A-180 for tightness. Bring the *E2* intermittent drive to its cut-in point. If the *E* line can be turned while the *E2* line is held, either A-182 or A-114 is slipping.

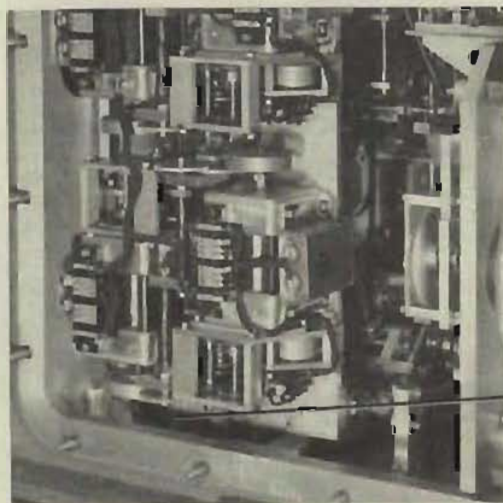
Adjustment

To remove the prediction follow-up mounting plate, refer to page 694.

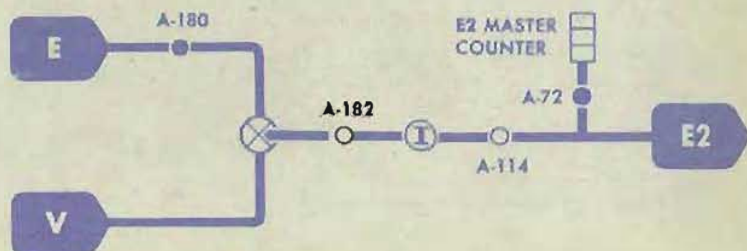
Tighten A-182 and A-114.

Check A-72.

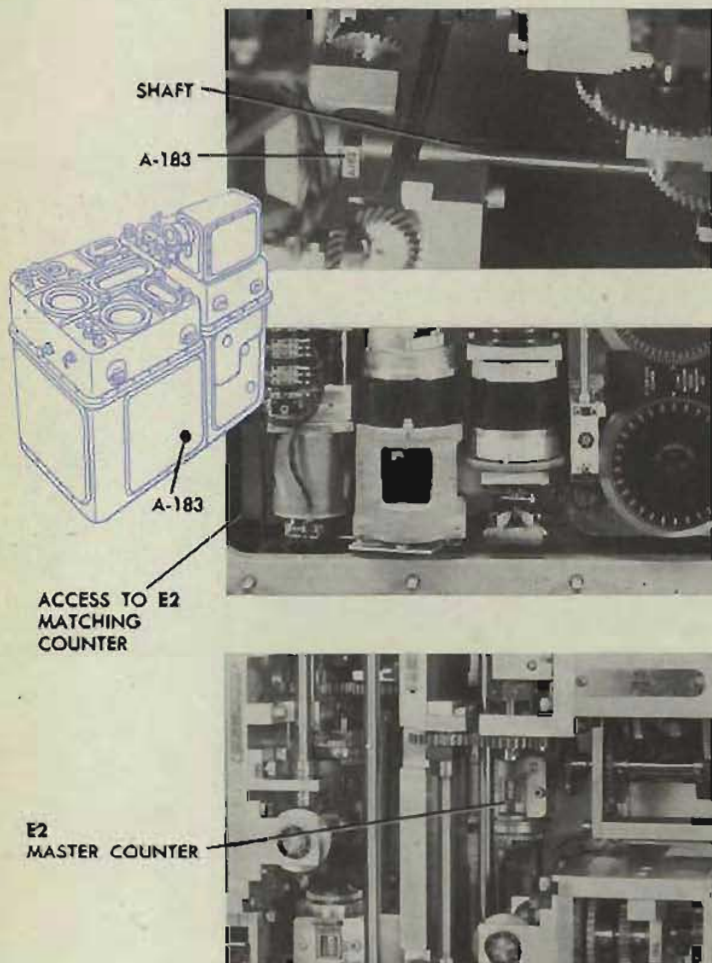
Reinstall the mounting plate. Refer to page 695.



ACCESS TO *E2* INTERMITTENT DRIVE



A-183 E2 MATCHING COUNTER to E2 MASTER COUNTER



Location

A-183 is under cover 5, near the lower rear corner of the follow-up mounting plate.

The E2 matching counter is under cover 6.

The E2 master counter is under cover 4, in the center of the ballistic section, directly above clamp A-72.

Check

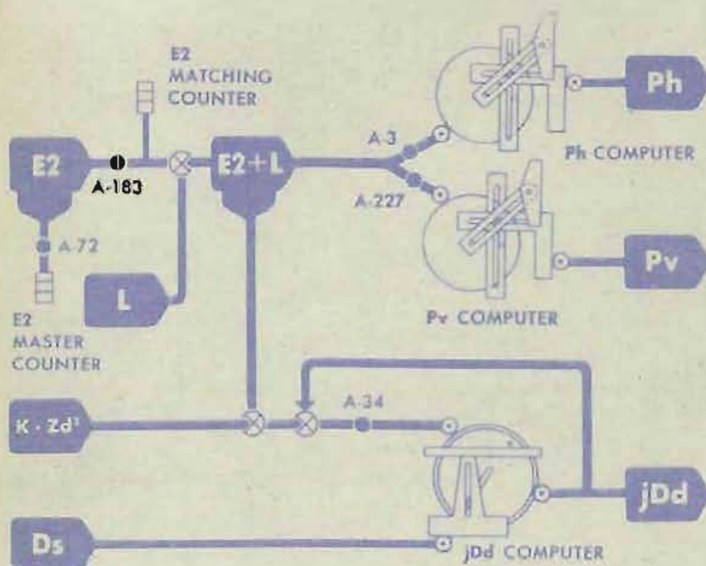
The E2 counters should agree.

Adjustment

If the E2 counters do not agree, loosen A-183.

Set an even reading on the E2 master counter.

Turn the shaft to the rear of A-183 until the E2 matching counter reads the same as the E2 master counter. Tighten A-183, and recheck.



IMPORTANT

If the E2 counters cannot be brought to the same value, A-34, A-3, or A-227 may be in error. Loosen and readjust the clamp causing the restriction.

Check A-34, A-3, and A-227.

A-184 Vs COUNTER to L-37

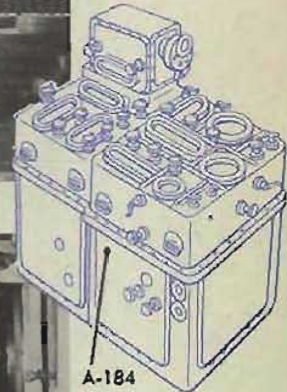
Location

A-184 is under cover 3, about 10 inches in. The clamp is on the rear end of a red shaft, 5 inches below the top plate.

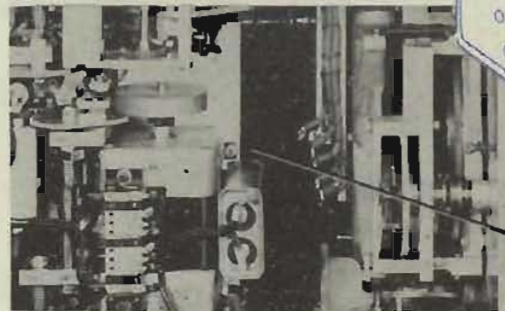
The lower end of L-37 can be seen under cover 5 through the access at the front of the integrator group.



A-184



A-184



ACCESS TO L-37 BEHIND PLATE

Check

Turn the power OFF.

Set the $V_f + P_e$ counters at 0' by turning the follow-up output gearing. Wedge the line.

Set I.V. at 2550 f.s.

Decrease V_s until L-37 reaches its lower limit. The V_s counter should read 200'.

Adjustment

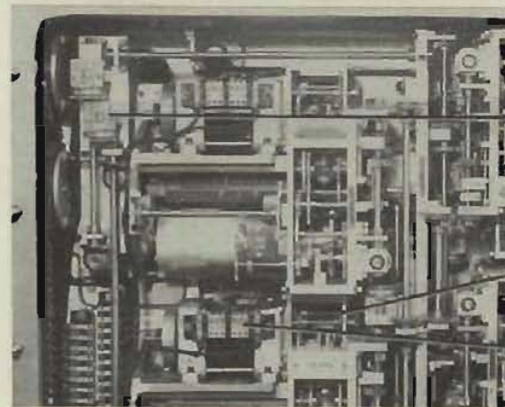
If the V_s counter does not read 200' at the lower limit, make A-184 slip-tight.

Wedge the V follow-up output gearing at the lower limit of L-37. Turn V_s to 200'.

Tighten A-184. Recheck at the upper limit of L-37.

The V_s counter should read 3800'.

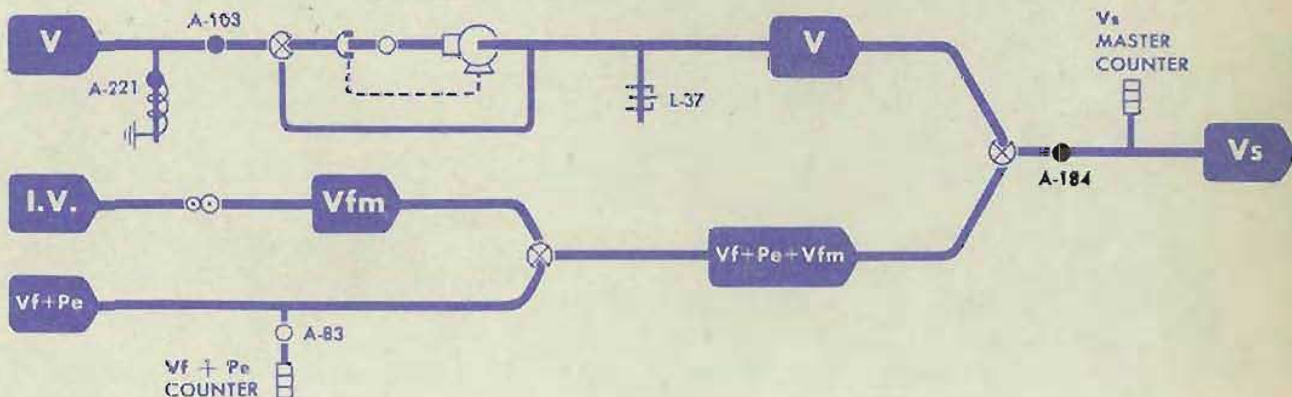
Check A-103.



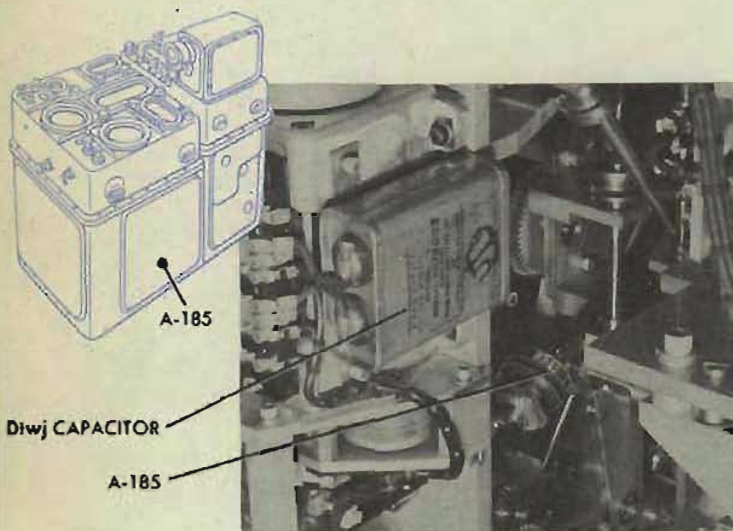
$V_f + P_e$ COUNTER

WEDGE HERE

$V_f + P_e$ FOLLOW-UP MOTOR



A-185 Dj HOLDING FRICTION



Location

A-185 is under cover 5.

Check

The friction should be tight enough to hold the *Dj* setting but not so tight as to overload the *Dj* receiver motor.

Turn the power ON.

Set *Sh* at 400 knots.

Set *A* at 90°.

Turn the *cR* line rapidly.

No motion of *Dtw'* should back through the *Dj* line.

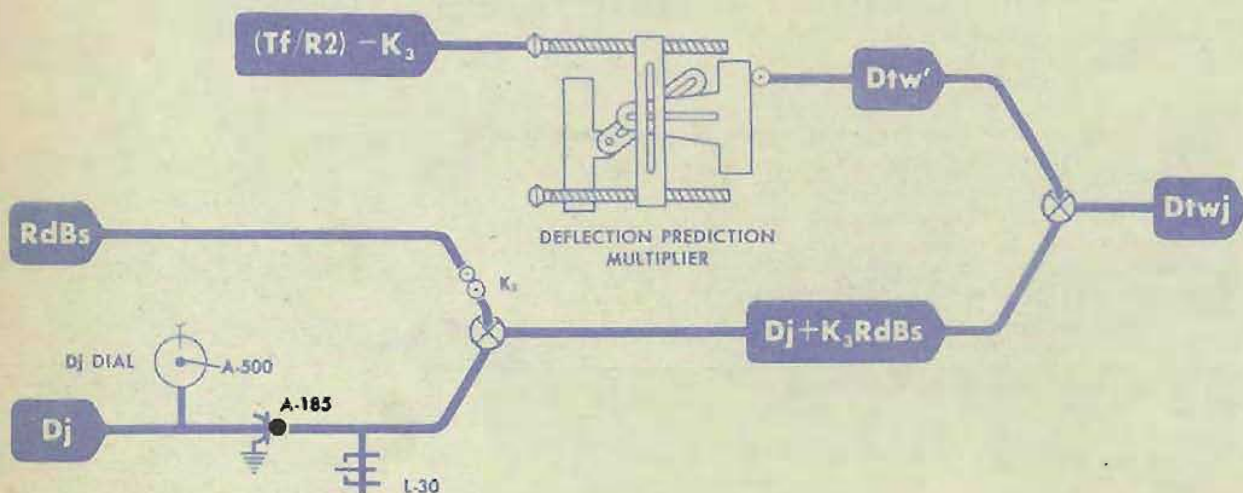
Run the synchronizing test of the *Dj* receiver, page 62. Check that the synchronizing time is within the allowable limits.

Adjustment

If *Dtw'* is backing through the *Dj* line, loosen A-185. Then turn the clamp clockwise to increase the friction.

If the *Dj* receiver motor runs too slowly, loosen A-185 and turn the clamp counterclockwise to decrease the friction.

Tighten A-185 and recheck.



A-186 V_j HOLDING FRICTION

Location

A-186 is under cover 5, on a diagonal shaft, 2 inches in back of the follow-up mounting plate.

Check

The V_j holding friction should be tight enough to hold the V_j setting but not so tight as to overload the V_j receiver motor.

Turn the power ON.

Set E at 0°.

Set dH at DIVE 250.

Turn the cR line rapidly.

No motion of V_{tw'} should back through the V_j line.

Run the synchronizing test of the V_j receiver, page 62.

Check that the synchronizing time is within the allowable limits.

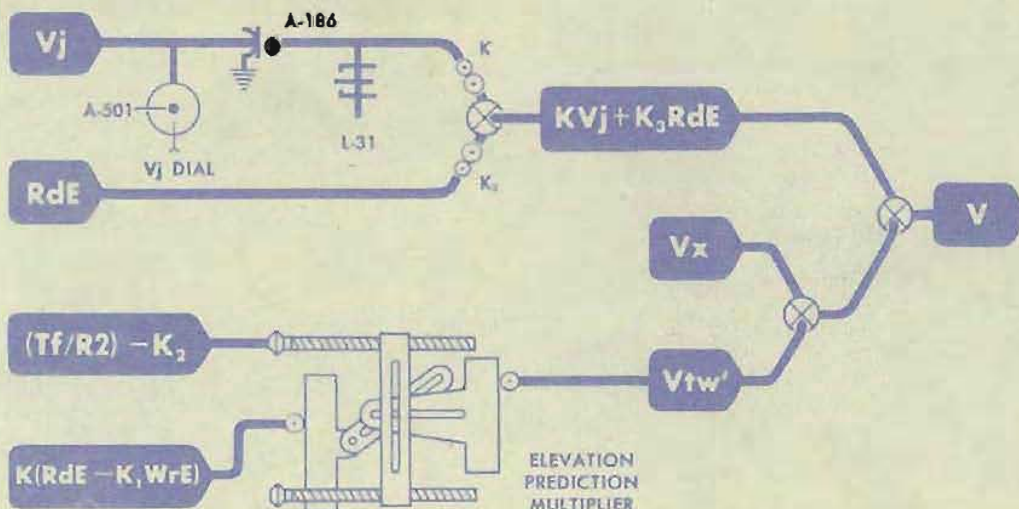
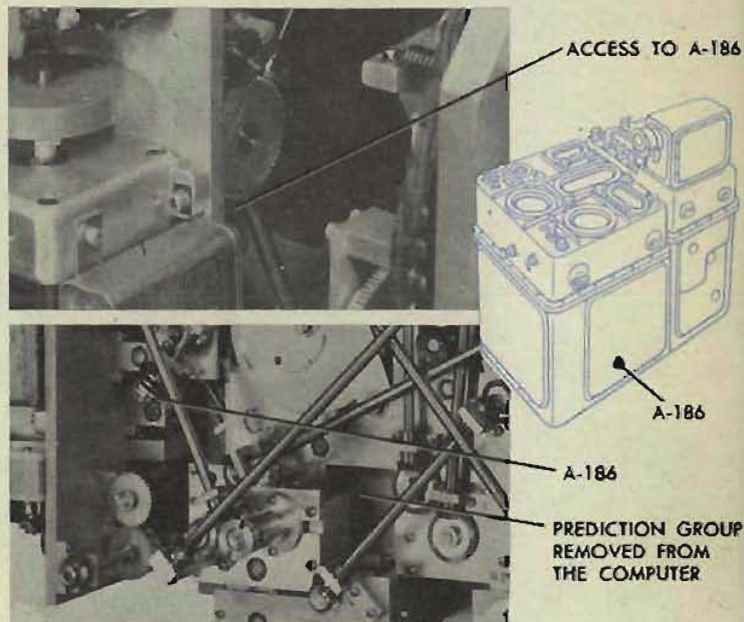
Adjustment

If V_{tw'} is backing through the V_j line, loosen A-186.

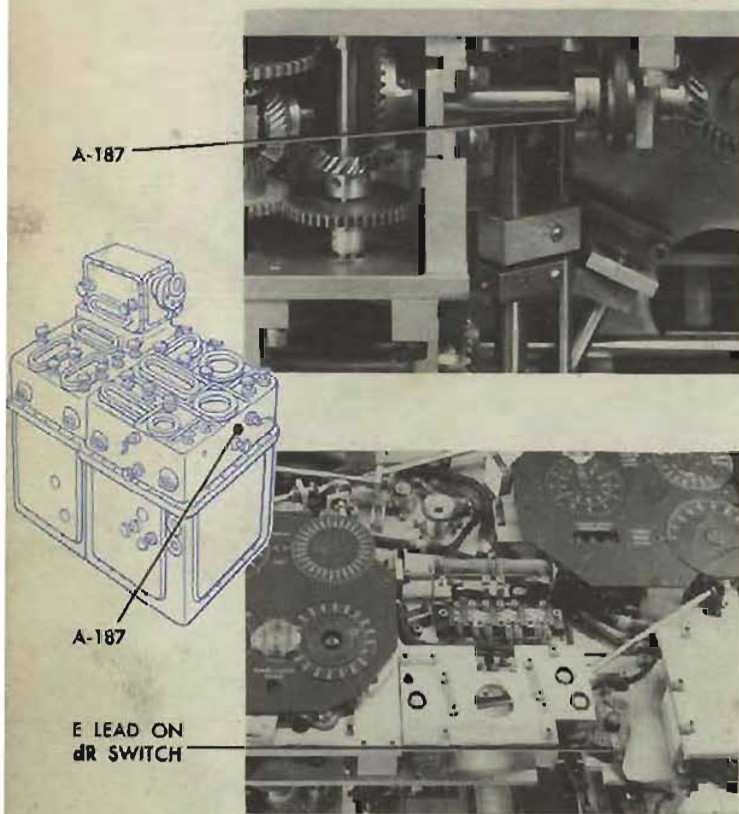
Turn the clamp clockwise to increase the friction.

If the V_j receiver motor runs too slowly, loosen A-186 and turn the clamp counterclockwise to decrease the friction.

Tighten A-186 and recheck.



A-187 jR HOLDING FRICTION



Location

A-187 is under cover 1, at the front.

Check

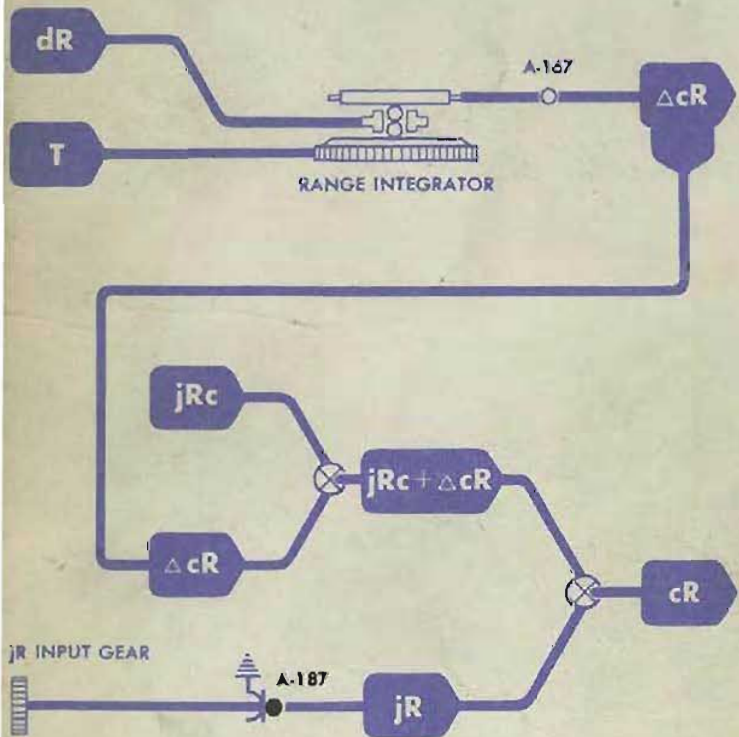
This friction should hold the *jR* setting without too much drag on the line.

Remove the E lead from the *dR* switch.

Turn the power ON.

Turn the time motor ON.

Set *dR* at -450 knots to offset the carriage of the range integrator so that the output roller will turn. The integrator output should not back through A-187 to the *jR* input.



Adjustment

If the range integrator output backs out the *jR* input, loosen A-187. Turn the clamp clockwise to increase the friction.

Tighten A-187, and recheck.

A-188 DEAD TIME MULTIPLIER to T_g DIAL

Location

A-188 is under cover 3, on the bevel gear at the lower end of L-14.

Check

Turn the power OFF.

Set T_g at 0 seconds. Use the T_g input gear.

On instruments with Ser. Nos. 781 and higher, set F and T_f at 10 seconds.

Wedge the R2 follow-up output gearing.

Set dR at -450 knots. Note the value on the R3 counter under cover 4.

Turn dR to +450 knots.

The R3 counter reading should not change.

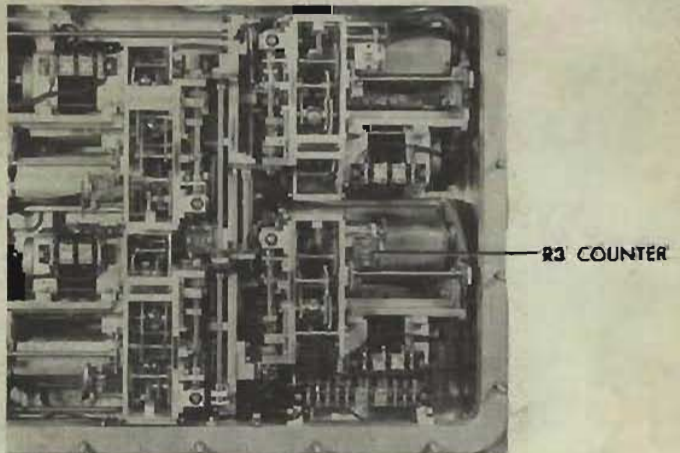
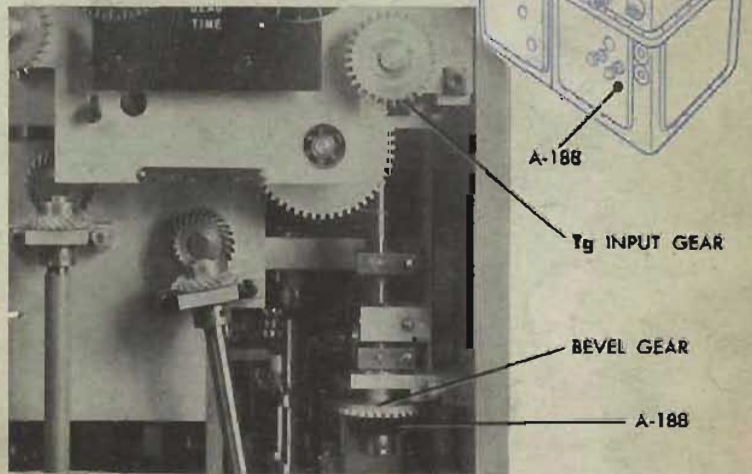
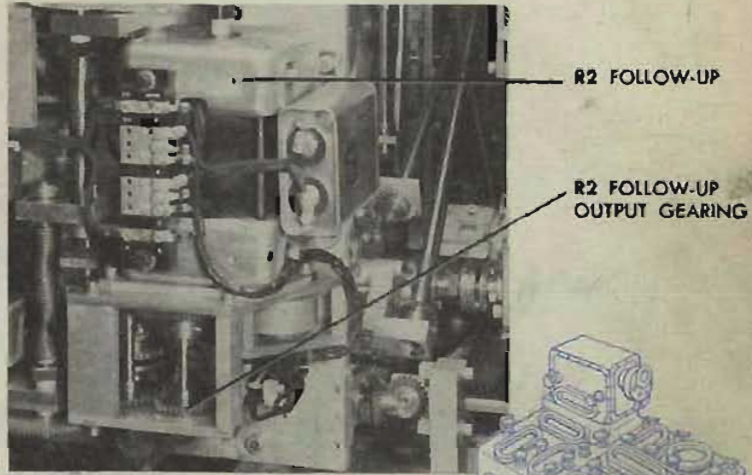
Adjustment

If the R3 counter reading changes, make A-188 slip-tight. Hold T_g at 0 and turn the bevel gear next to the clamp, to correct halfway back to the original R3 reading.

Tighten A-188 and recheck.

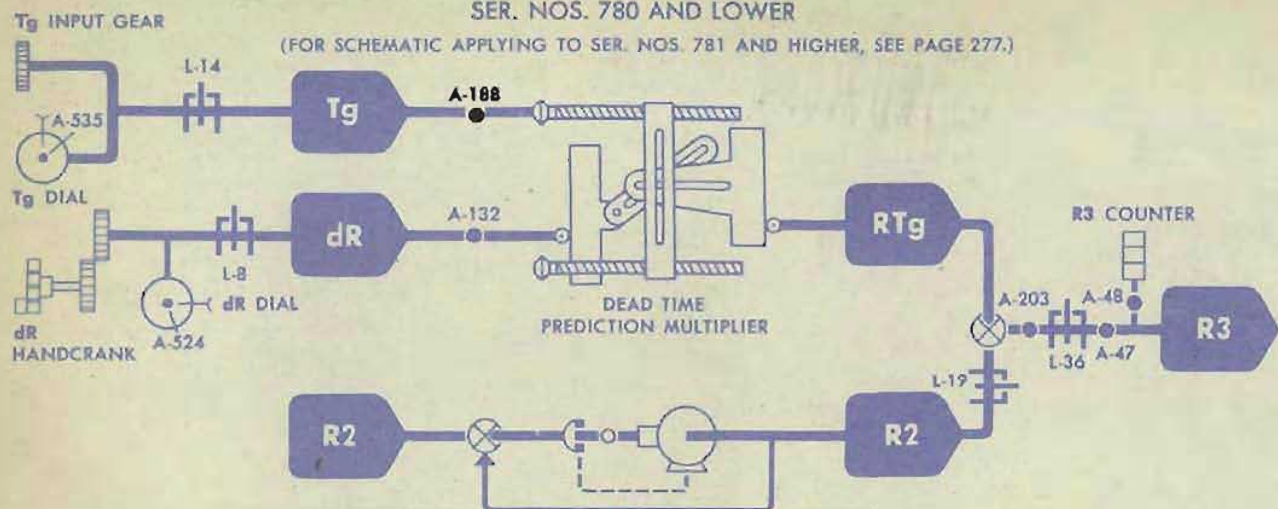
Remove the wedge from the R2 follow-up.

Check A-203.

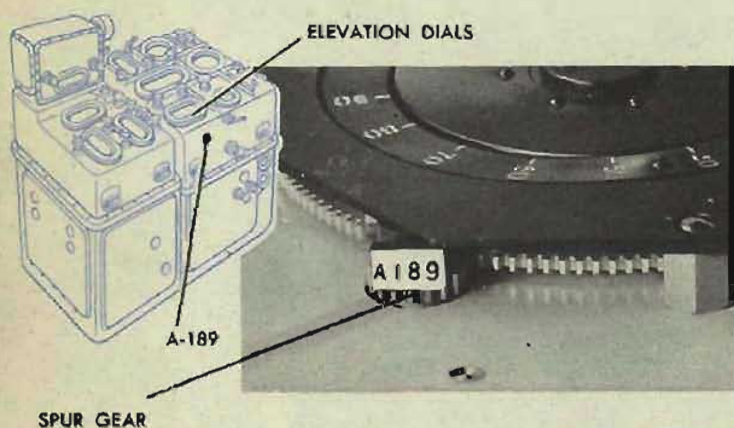


SER. NOS. 780 AND LOWER

(FOR SCHEMATIC APPLYING TO SER. NOS. 781 AND HIGHER, SEE PAGE 277.)



A-189 COARSE to FINE E DIALS



Location

A-189 is under cover 1, beneath the mask of the elevation dials, to the left of the coarse E dial.

Check

Set the fine E dial at 0°. One of the graduations of the coarse E dial should line up with the fixed index.

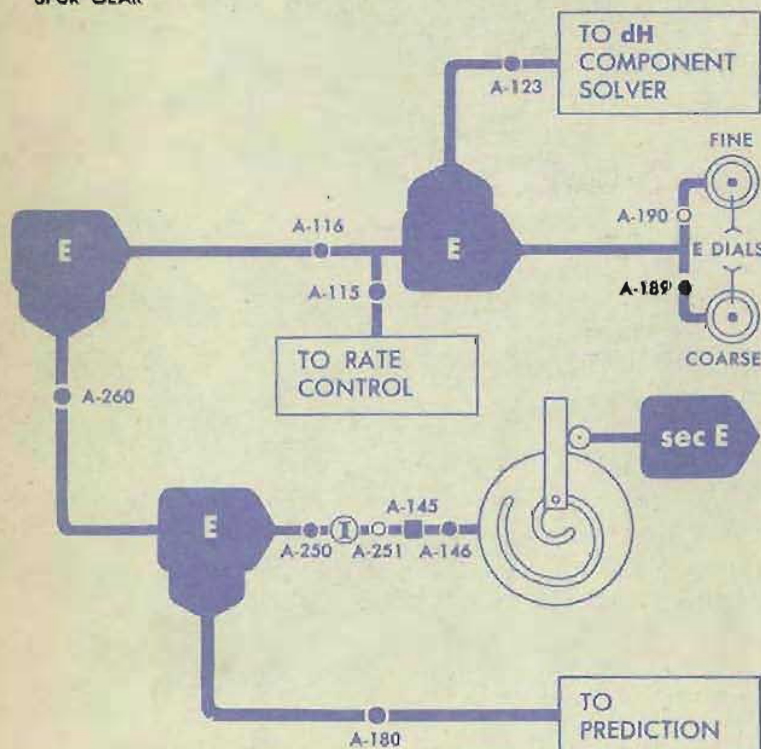
Before readjusting A-189, check A-190.

Adjustment

If the coarse dial does not read correctly, make A-189 slip-tight.

Set the fine dial at 0°. Bring the nearest graduation of the coarse dial to the fixed index by turning the spur gear directly below A-189. Tighten the clamp and recheck.

Check A-116, A-115, A-123, A-180, A-260, A-250, and A-145.



A-190 ASSEMBLY CLAMP

Location

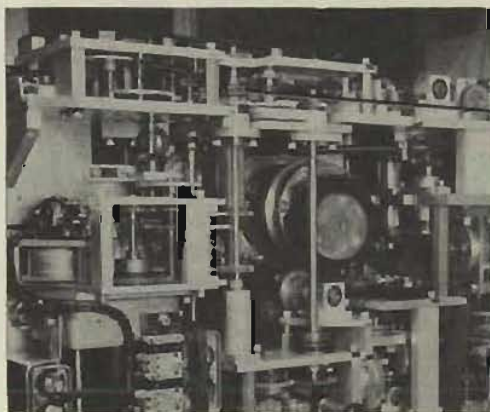
A-190 is under cover 1, near the fine E dial.

Check

If A-190 is loose or has slipped, the fine and coarse E dials will no longer match.

At the upper limit, the fine E dial will not read $5^{\circ}0'$, although the coarse dial reading will be halfway between the 80° and 90° graduations.

If both these conditions exist, A-190 should be readjusted.



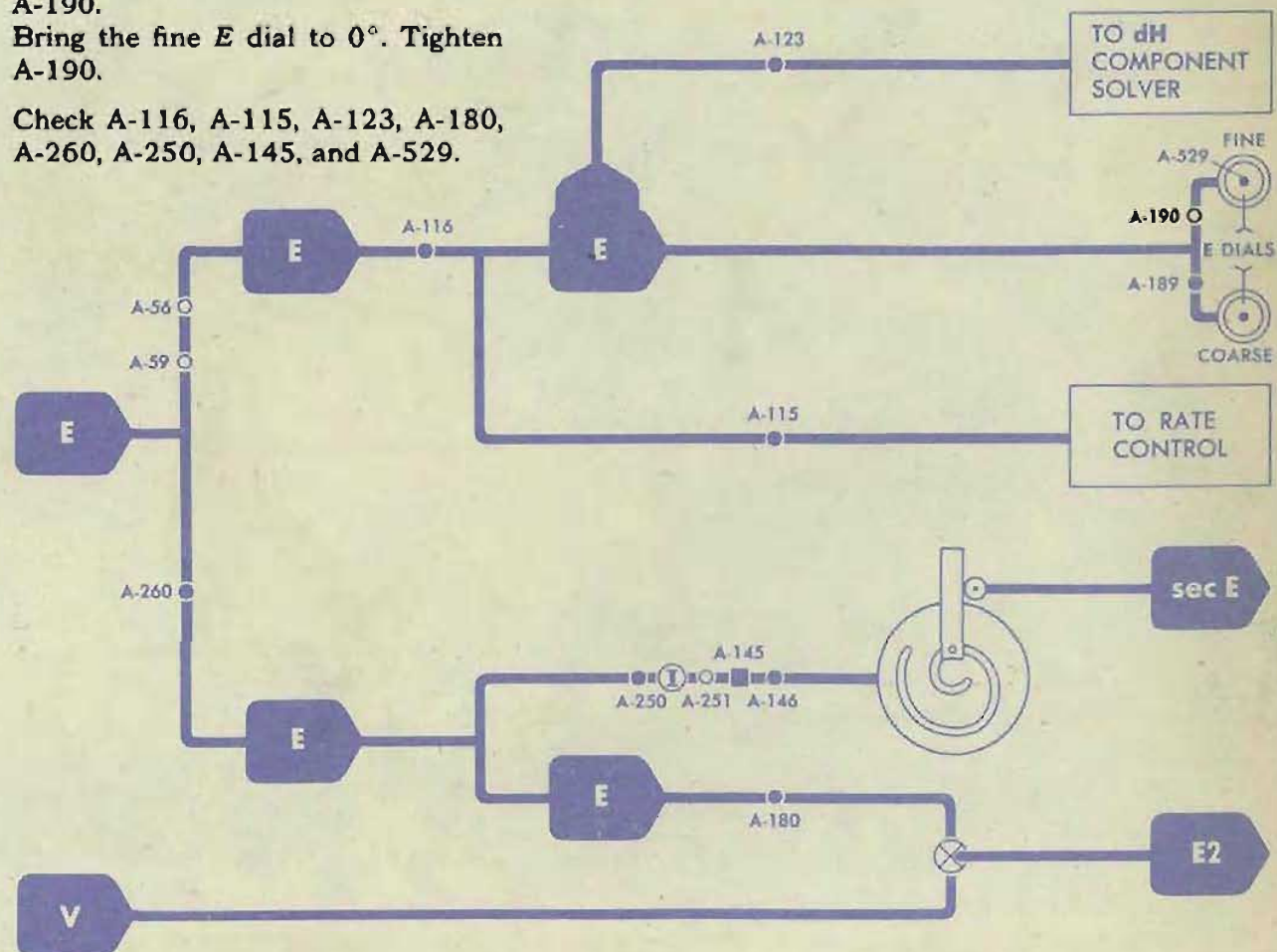
A-190

Adjustment

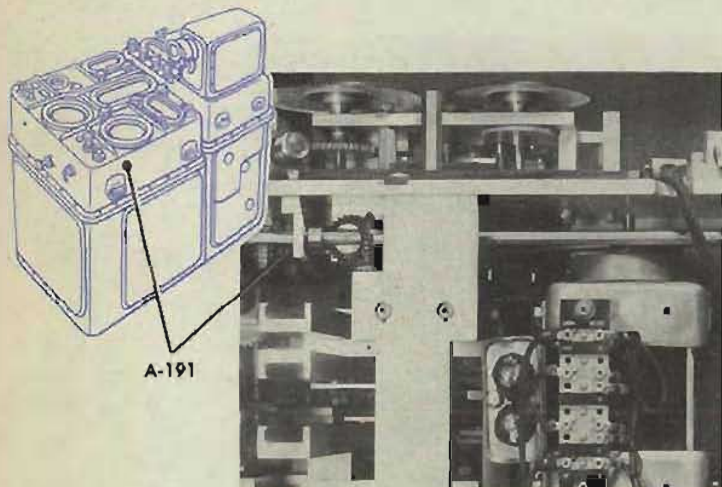
Set the coarse E dial at 0° . Loosen A-190.

Bring the fine E dial to 0° . Tighten A-190.

Check A-116, A-115, A-123, A-180, A-260, A-250, A-145, and A-529.



A-191 FRICTION DRIVE to TIME DIAL

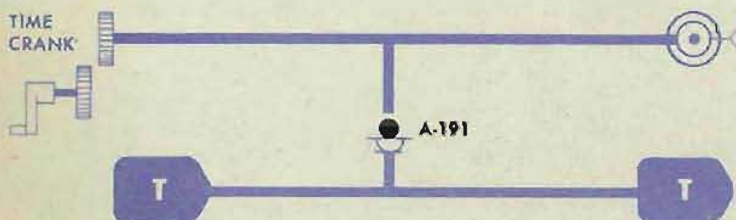


Location

A-191 is under cover 1, at the right side.

Check

This friction should slip when the time crank is pushed IN and turned. It should drive when the time crank is pulled OUT and turned, or when the time line is driven by the time motor.

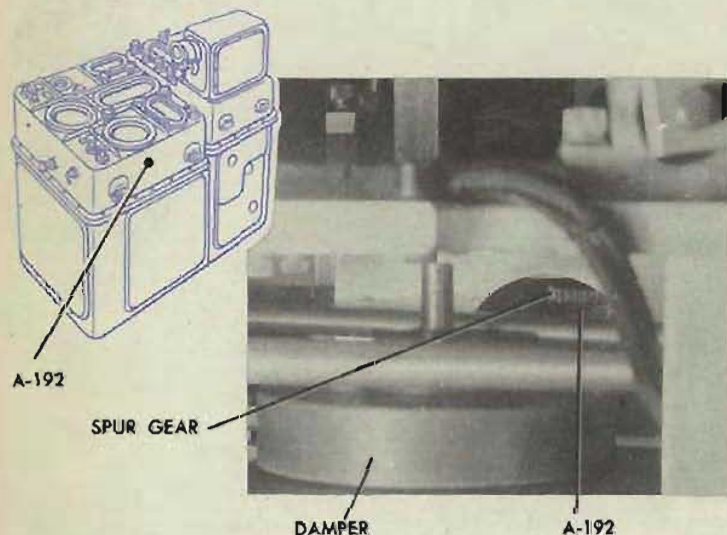


Adjustment

If the friction is not adjusted properly, loosen A-191. Turn the clamp clockwise to increase the friction, or counterclockwise to decrease it.

Tighten the screw, and recheck.

A-192 TARGET COMPONENT SOLVER to Sh COUNTER



Location

A-192 is under cover 1, behind the damper on the *RdB*s follow-up.

Possible damage

If A-192 is upset, the pin and cam groove in the target component solver may be damaged. Check for damage by running the *Sh* line through its full travel and noting any restriction.

Check

Remove the KRR lead on the target angle switch.

Turn the power ON.

Set *Br* at 0°. Wedge the line.

Set *So* and *Sh* at 0 knots. Wedge the input gears.

Set *A* at 90°.

The ship component solver outputs are now at zero.

The *RdBs* follow-up will indicate motion only from the target component solver.

Mark the *RdBs* follow-up output gearing for use as an indicator.

Turn *A* from 90° to 270°.

The follow-up indicator marks should remain matched.

Adjustment

If the indicator marks do not stay matched, slip-tighten A-192. Use a gear pusher to turn the spur gear, on which A-192 is located, until the indicating mark on the *RdBS* follow-up gear is halfway back to its original position. Tighten A-192.

Recheck

Set *A* at 90°.

Remove the old indicator marks and make new ones.

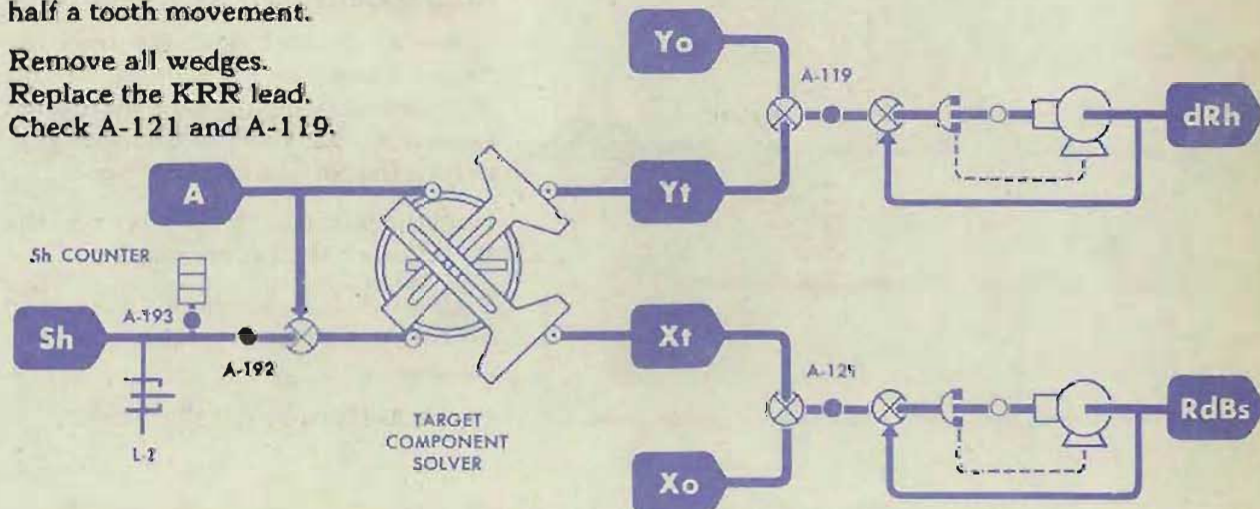
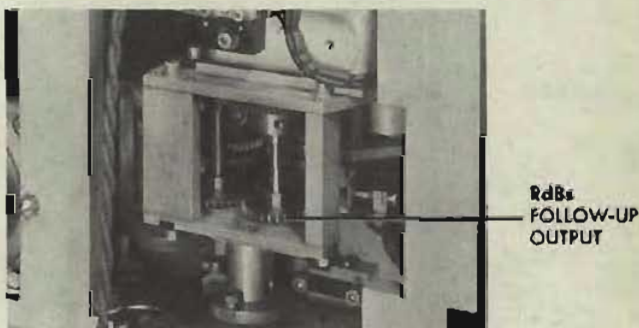
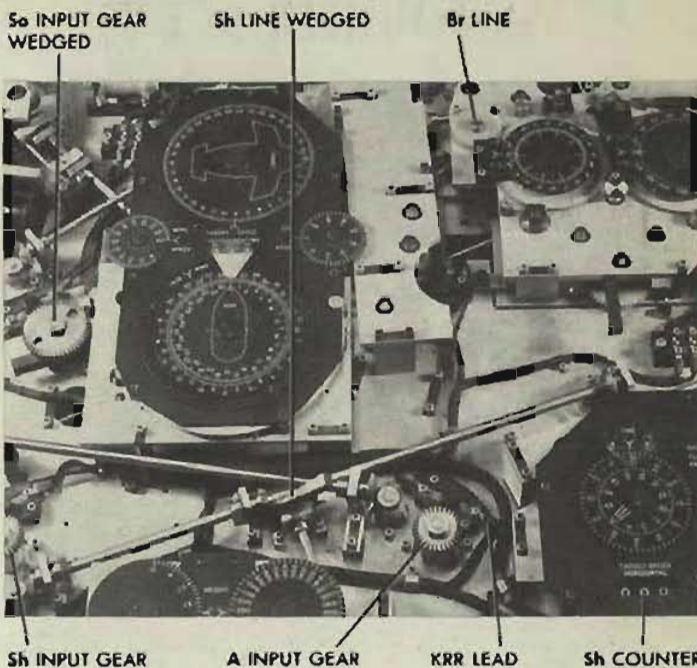
Turn *A* to 270°.

Check the movement of the marks. The error, if any, should be less than half a tooth movement.

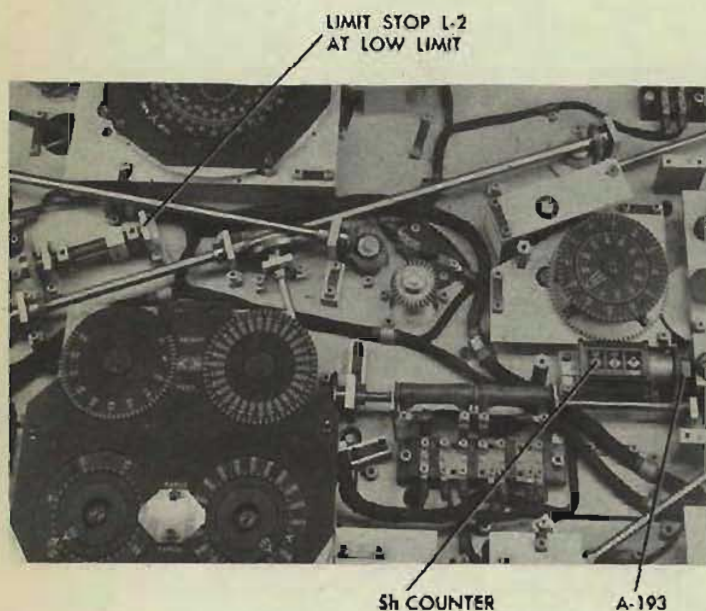
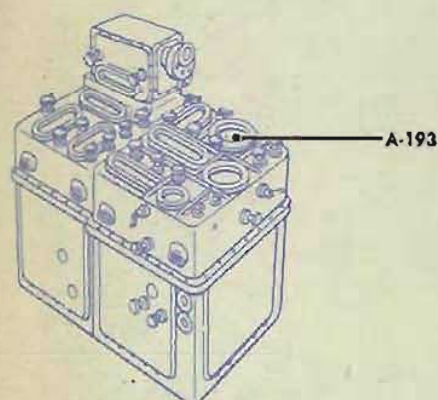
Remove all wedges.

Replace the KRR lead.

Check A-121 and A-119.



A-193 Sh COUNTER to L-2



Location

A-193 is under cover 1, on the *Sh* counter shaft under the mask.

L-2 is under cover 1, to the rear of the coarse *H* dial. The lower limit is toward the right.

Check

Turn the power OFF.

Turn the *Sh* line to either limit. At the upper limit, the *Sh* counter should read 400 knots; at the lower limit, 0 knots.

If either limit cannot be reached, A-192 or A-137 may be causing the restriction.

Determine which is in error and loosen it.

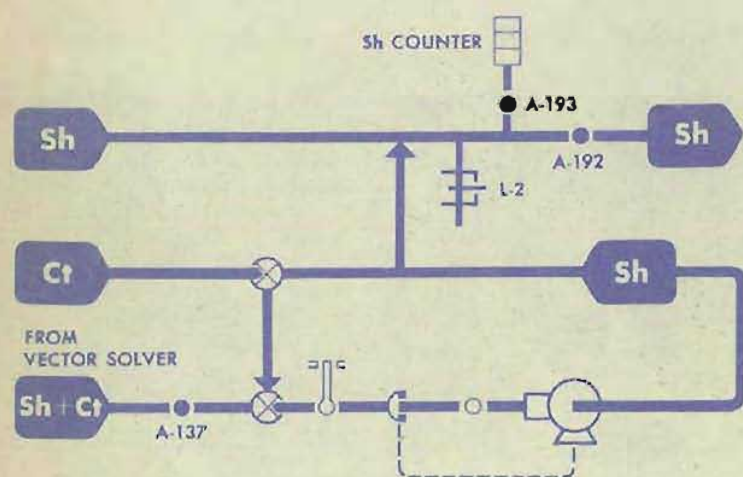
Adjustment

If the *Sh* counter does not read the proper values for each limit, remove the mask covering the time dial group. Loosen A-193. Use the *Sh* input gear to turn the *Sh* line to either limit.

Hold the line against the stop. Slip the *Sh* counter to its proper reading.

Tighten A-193. Recheck by turning *Sh* between its limits and reading the counter.

Check A-192 and A-137.



A-194 SHIP COMPONENT SOLVER to Br RING DIALS

Location

A-194 is under cover 1, below the bearing dial mask, to the rear of the fine *Br* dial.

Check

Disconnect lead *KRR* from the target angle push-button switch to prevent the *A* and *Sh* follow-ups from driving.

Turn the power ON.

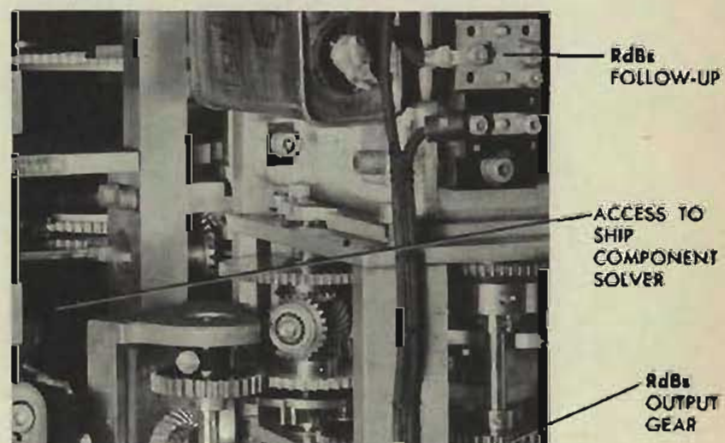
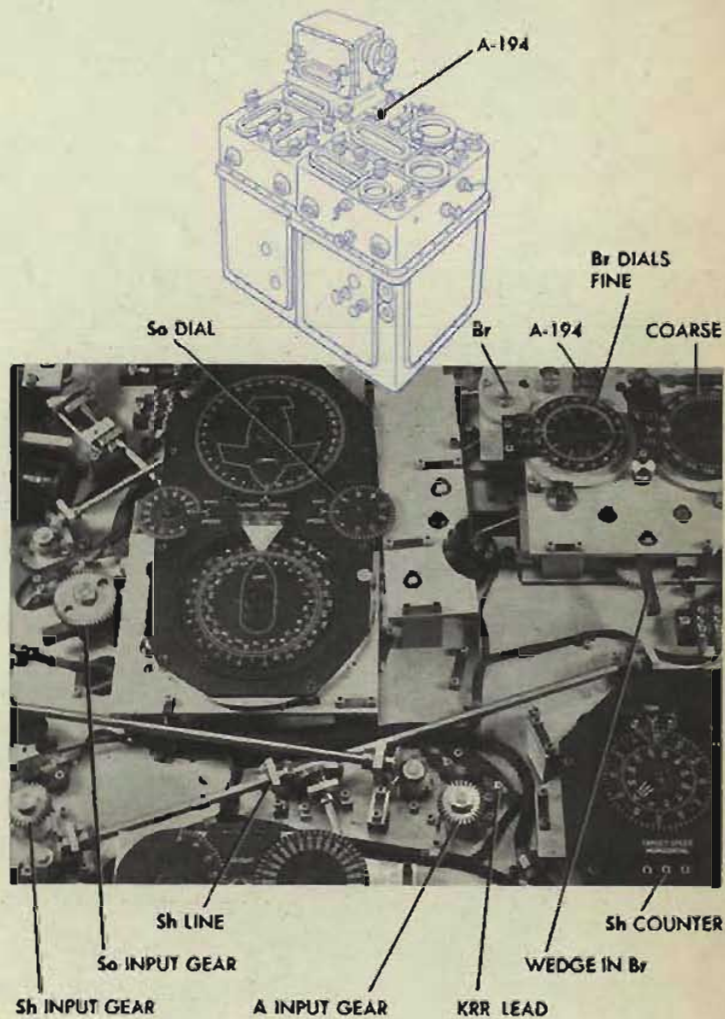
Set *Br* at 180° . Wedge the line at the dial unit.

Set *A* at 0° , and *Sh* at 0 knots. Wedge the lines.

Set *So* at 0 knots.

The ship component solver vector-gear slot should be forward. Check its position by looking through the access at the right front, just forward of the *RdBs* follow-up. The ship component solver is the bottom component solver.

Movement of the *RdBs* follow-up output gearing will indicate motion of the *Xo* rack of the ship component solver. Mark the *RdBs* follow-up output gear for use as an indicator.



Run *So* from 0 to 45 knots. There should be no motion of the *Xo* rack.

Observe the follow-up indicator marks. They should remain matched for full travel of *So*.

Adjustment

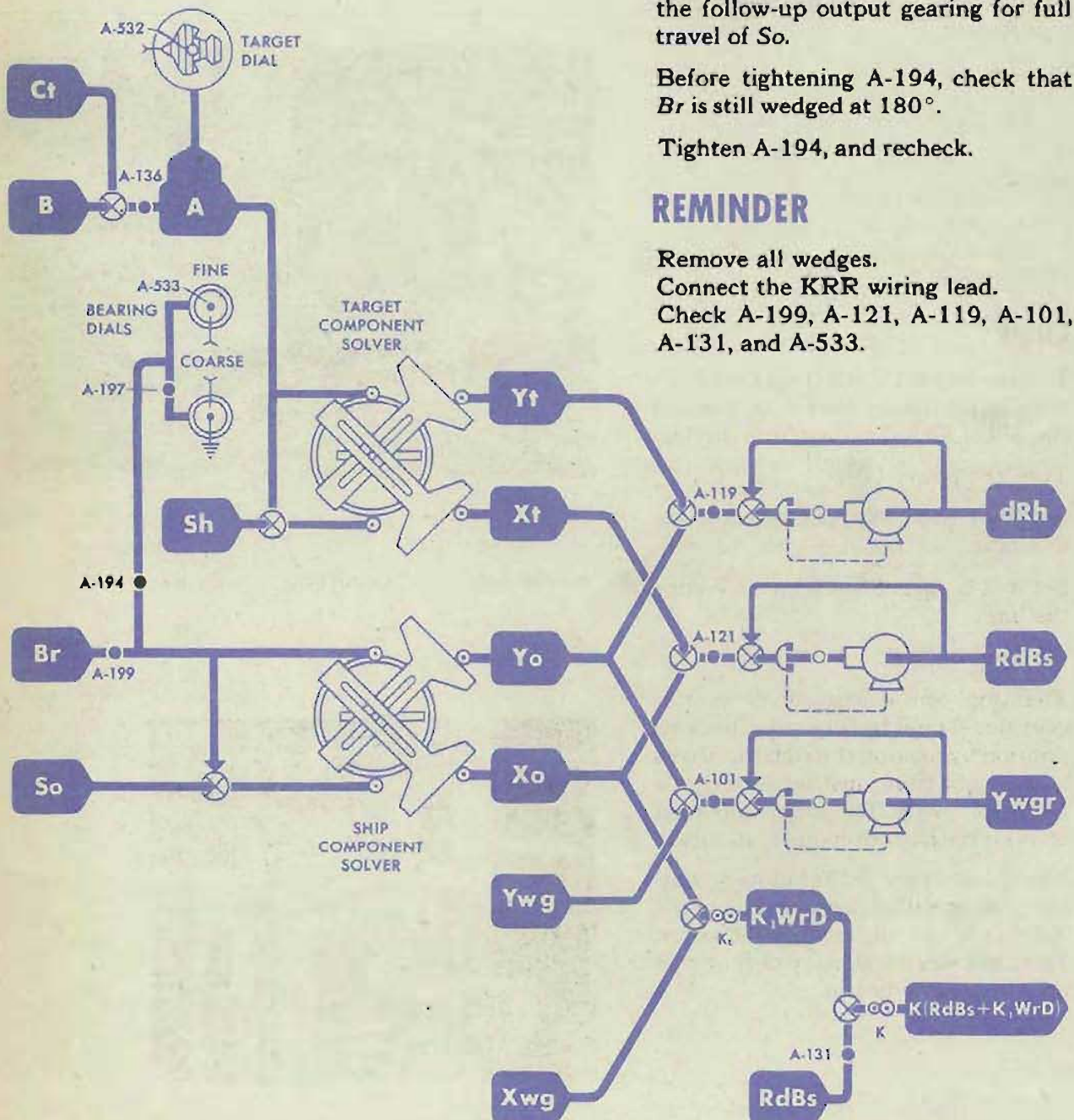
If the marks do not remain matched, slip-tighten A-194. With a gear pusher, turn the ship component solver vector gear until its slot is at a position where there is no movement of the follow-up output gearing for full travel of *So*.

Before tightening A-194, check that *Br* is still wedged at 180°.

Tighten A-194, and recheck.

REMINDER

Remove all wedges.
Connect the KRR wiring lead.
Check A-199, A-121, A-119, A-101, A-131, and A-533.



A-195 COARSE to FINE cR DIAL

Location

A-195 is under cover 1, below the cR dial mounting plate.

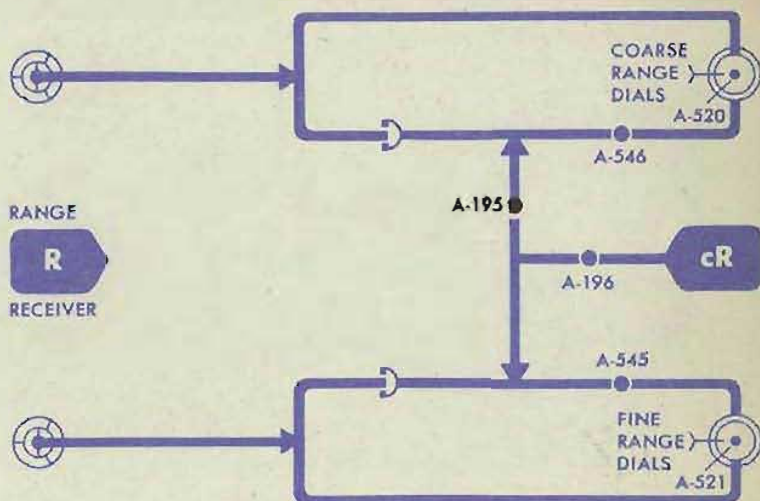
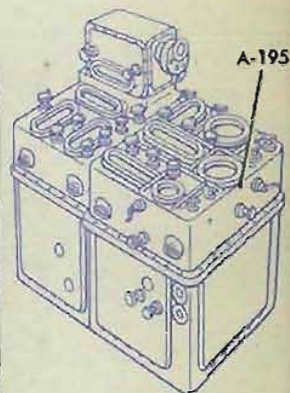
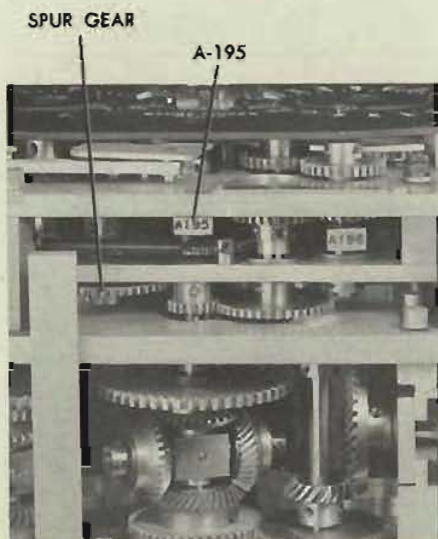
Check

Turn cR until the index on the fine ring dial matches the fixed index. An even thousand graduation of the coarse ring dial should also be at the fixed index.

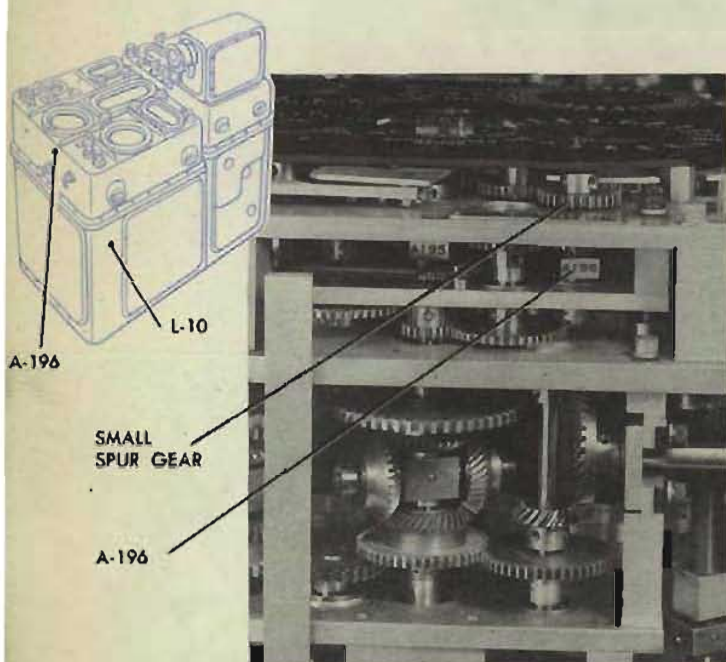
Adjustment

If an even thousand graduation is not at the fixed index, slip-tighten A-195. Bring an even thousand graduation of the coarse dial to the fixed index by turning the spur gear below the left front of the cR dial mask.

Tighten A-195, and recheck.
Check A-196.



A-196 cR DIALS to L-10



Location

A-196 is under cover 1, below the cR dial mounting plate.

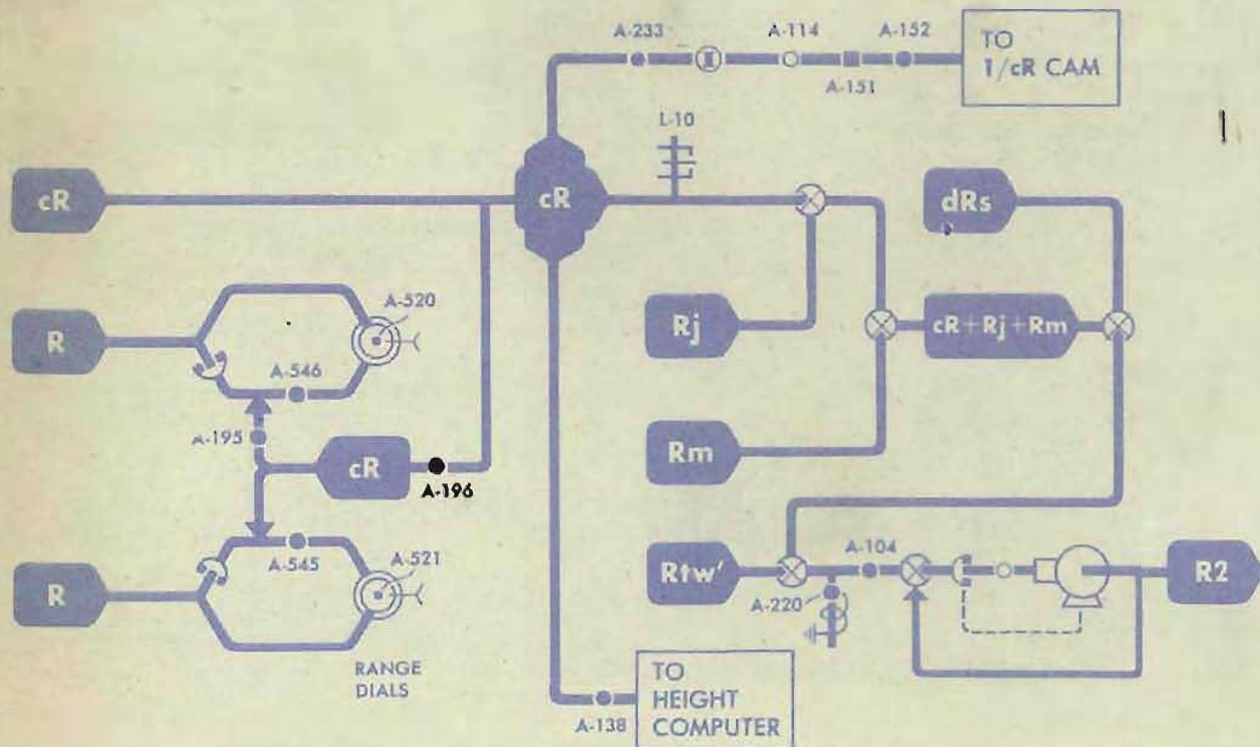
L-10 is under cover 5. It is in a horizontal position with its lower limit toward the rear.

Check

L-10 should operate at 0 and 35,000 yards on the cR dials, except in Mods 0, 1, 2, and 9. In these mods the limits are 0 and 22,500 yards.

IMPORTANT: If either limit cannot be reached, A-138 or A-233 may be causing an obstruction. Determine which clamp is upset, and loosen it.

Turn cR until the lower limit of the stop is reached. The cR dials should read 0 yards.



Adjustment

If the *cR* dials do not read 0 yards, hold the line against the stop. Loosen A-196.

Bring the *cR* dials to zero by using a gear pusher to turn the small spur gear under the right front of the dial mask.

Tighten A-196.

Recheck by running *cR* to the upper limit.

Check A-138, A-233, A-151, and A-104.

A-197 COARSE to FINE *Br* RING DIAL

Location

A-197 is under cover 1, below the front of the bearing dial mask, near the fine *Br* dial.

Check

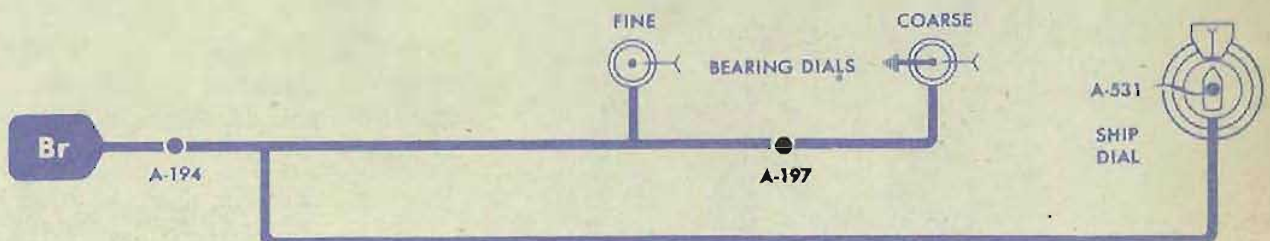
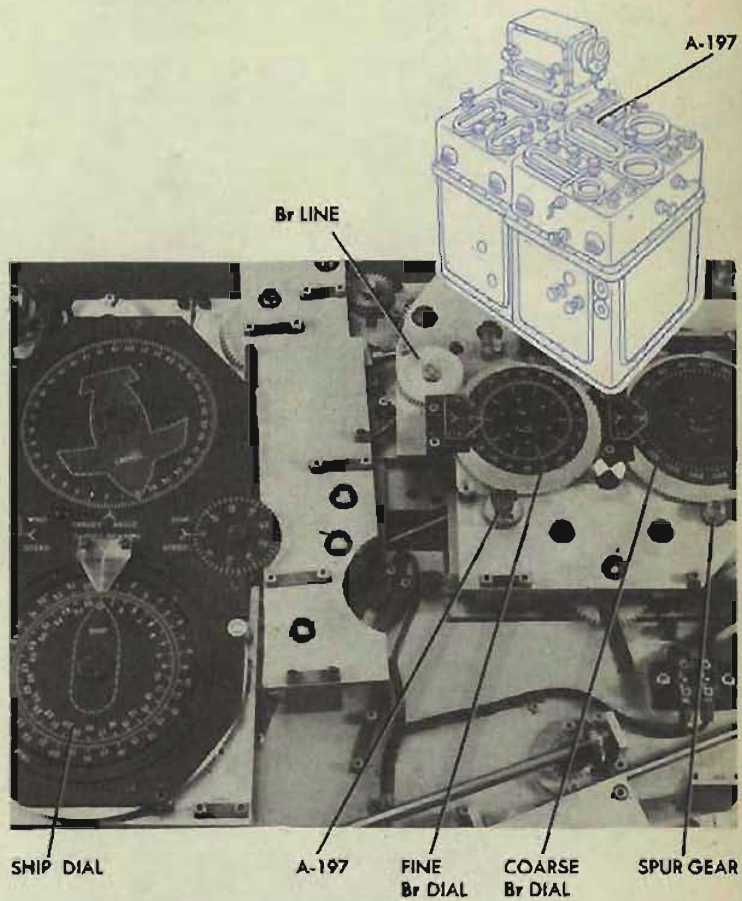
Set the ship dial and the fine *Br* dial at 0°.

The coarse *Br* dial should read 0°.

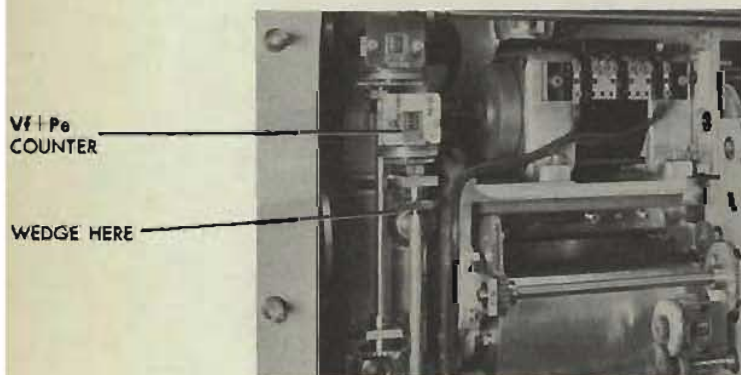
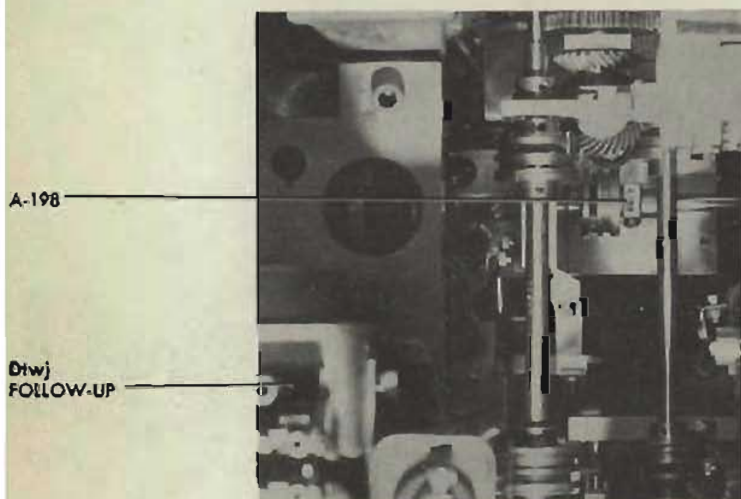
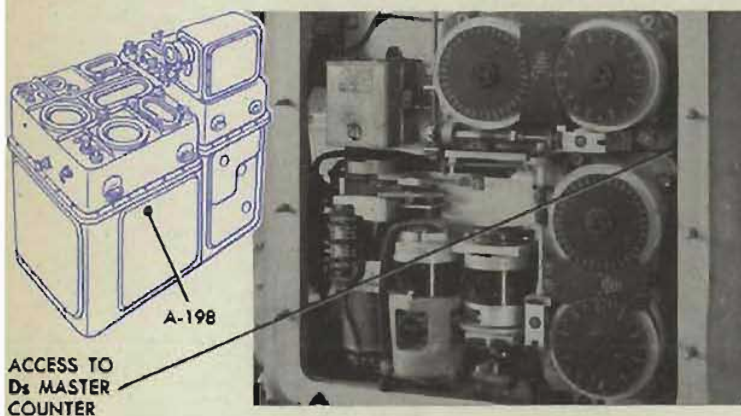
Adjustment

If the coarse *Br* dial does not read 0°, make A-197 slip-tight. Wedge the *Br* line. Slip the coarse dial to 0° by turning the meshing gear. Tighten A-197, and recheck.

Check A-194 and A-531.



A-198 Ds MASTER COUNTER to L-28



Location

A-198 is under cover 5, to the rear of a coupling on a horizontal shaft.

The *Ds* master counter is under cover 8, behind the *B'gr* transmitter mounting plate.

L-28 is under cover 5, behind the *Dtwj* follow-up. It is in a vertical position with its upper limit at the top.

Check

The *Ds* master counter should read 9982 (-518 mils) at the lower limit, and 1018 (+ 518 mils) at the upper limit.

Turn the power OFF.

Set the *V/I + P/e* counter at 100 minutes (010) by turning the gearing to the counter under cover 4 at the top left, and wedge the line.

Set *I.V.* at 2550 f.s.

Increase *Ds* to the upper limit. The *Ds* counter should read 1018 mils.

Adjustment

If the *Ds* master counter does not read 1018 mils at the upper limit, loosen A-198.

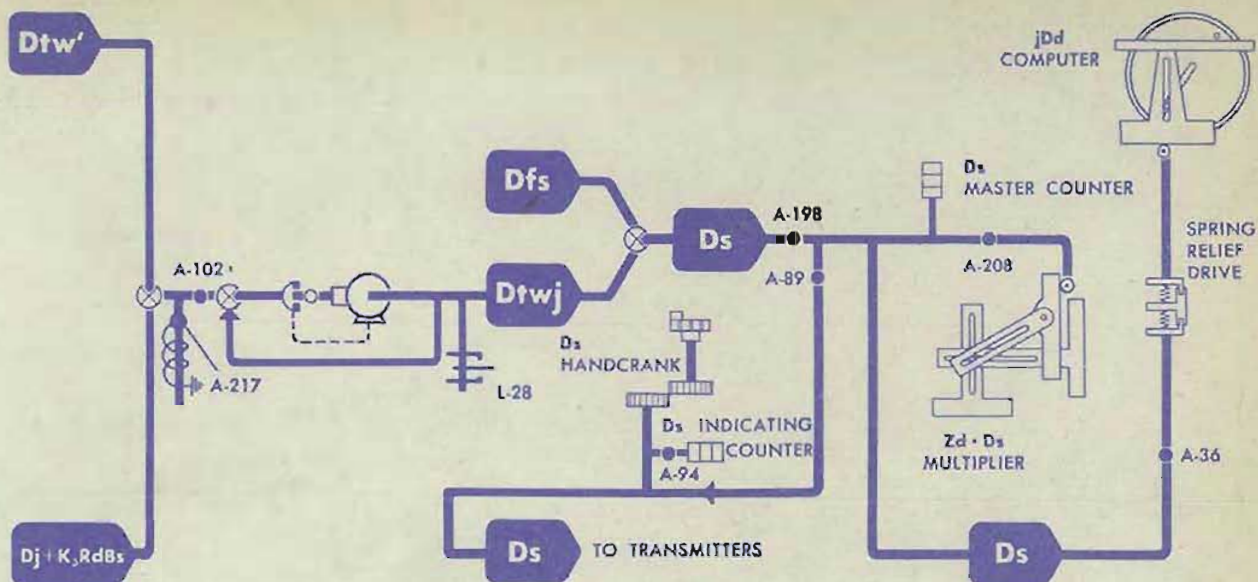
Wedge the *Dtwj* follow-up output gear against the limit. Turn the *Ds* handcrank until the *Ds* counter reads 1018 mils. Tighten A-198 and run *Ds* to its lower limit. The counter should read 9982.

IMPORTANT

If L-28 cannot be set at either limit, A-208 or A-36 may be causing a restriction. Loosen whichever clamp is interfering and readjust it later.

Remove the wedges from the *Dtwj* follow-up and the *V/I + P/e* line.

Check A-102, A-110 and A-105.



A-199 Br RING DIALS to L-18

Location

A-199 is under cover 3, on a horizontal shaft near the top plate, about 18 inches in toward the center.

L-18 is under cover 7, on the reverse side of the plate behind the output gearing of the *jB'r* follow-up motor. The upper limit is at the top.

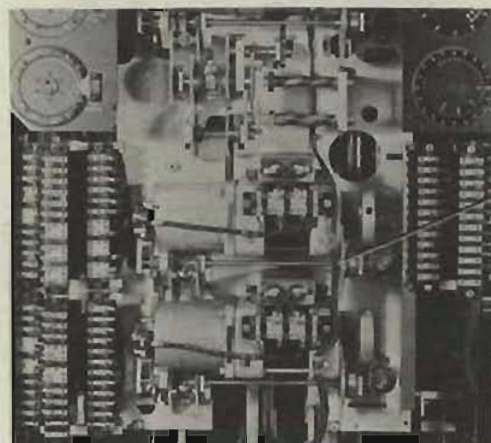
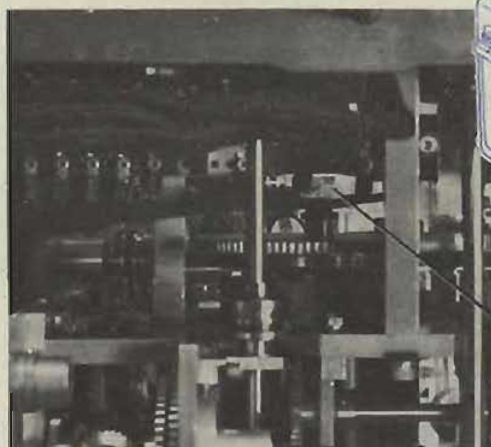
Check

Turn the power OFF.

Set *Dd* at 0° and wedge the line.
 Set *B'gr* at 0° and wedge the line.
 Turn the *jB'r* follow-up output gear until the upper limit of L-18 is reached.
 The *Br* dials should read $11^\circ 40'$.

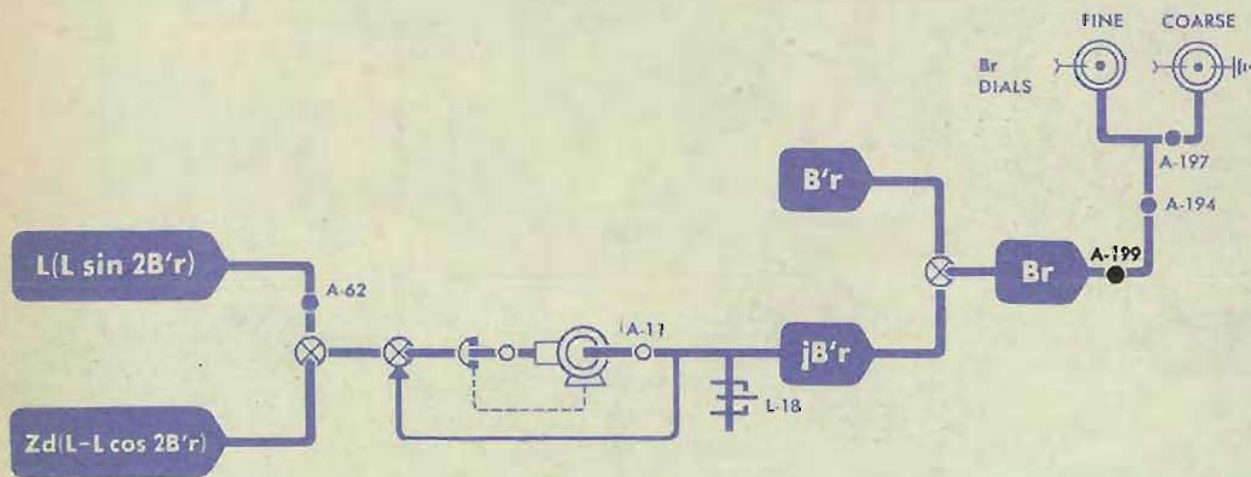
Adjustment

If the *Br* dials do not read $11^\circ 40'$, hold *jB'r* against the stop. Loosen A-199. Use a gear pusher to turn the gear on which A-199 is mounted until the *Br* dials read their proper value. Tighten A-199, and recheck by running *jB'r* to the lower limit. The *Br* dials should read $348^\circ 20'$.

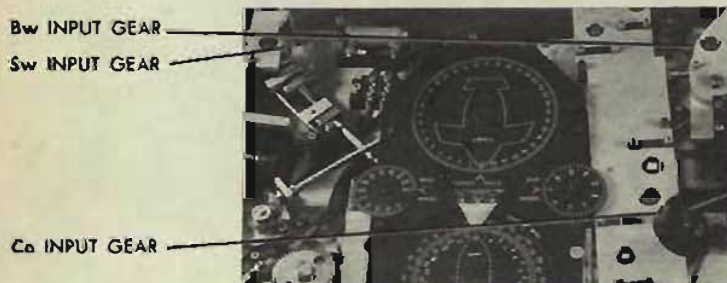
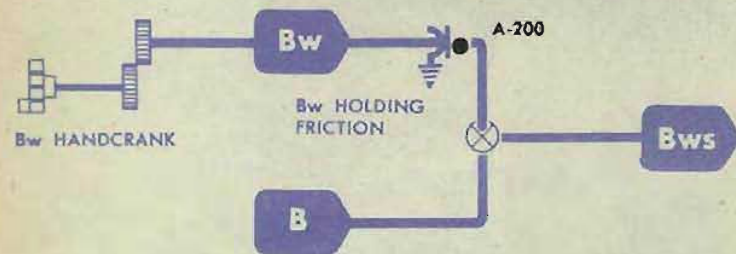
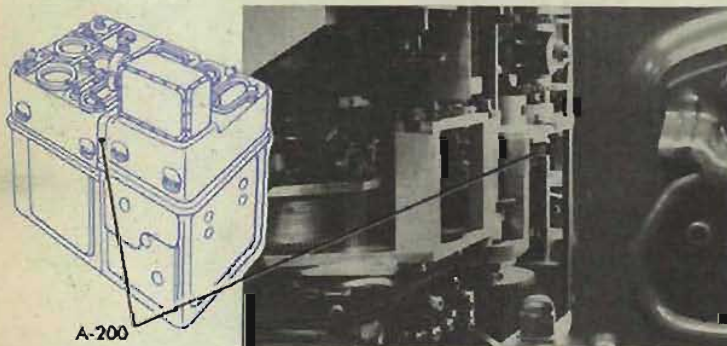


Remove the wedges from the *Dd* and *B'gr* lines.

Check A-62.



A-200 Bw HOLDING FRICTION



Location

A-200 is under cover 1, at the right rear.

Check

The friction should hold the *Bw* setting without too much drag on the line.

Set *Sw* at 40 knots. Use the *Sw* input gear.

Turn the *Co* input gear. There should be no motion of the *Bw* input gear.

Adjustment

If the *Bw* input gear moves, loosen A-200 and turn the clamp until there is enough friction to hold the setting.

Tighten A-200, and recheck.

IMPORTANT

Increase the friction only to the point where no motion backs through *Bw*, and the *Bw* input gear still turns easily.

A-201 jBr HOLDING FRICTION

Location

A-201 is under cover 1, at the right rear.

Check

This friction should hold the *jBr* setting without too much drag on the line.

Turn the power ON.
Turn the time motor ON.

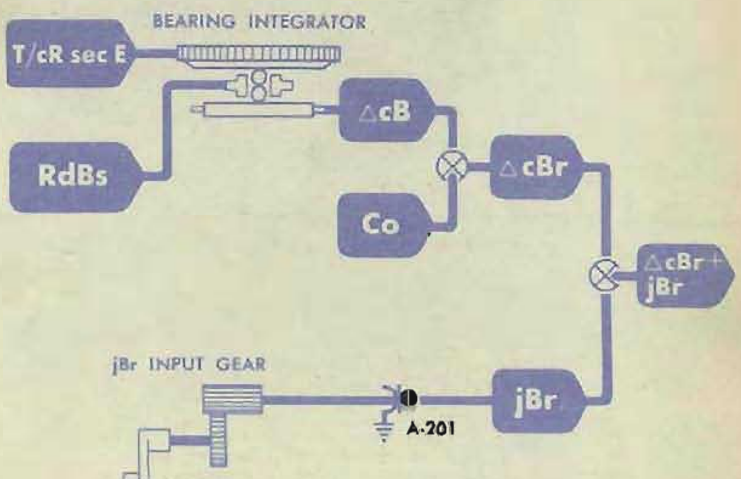
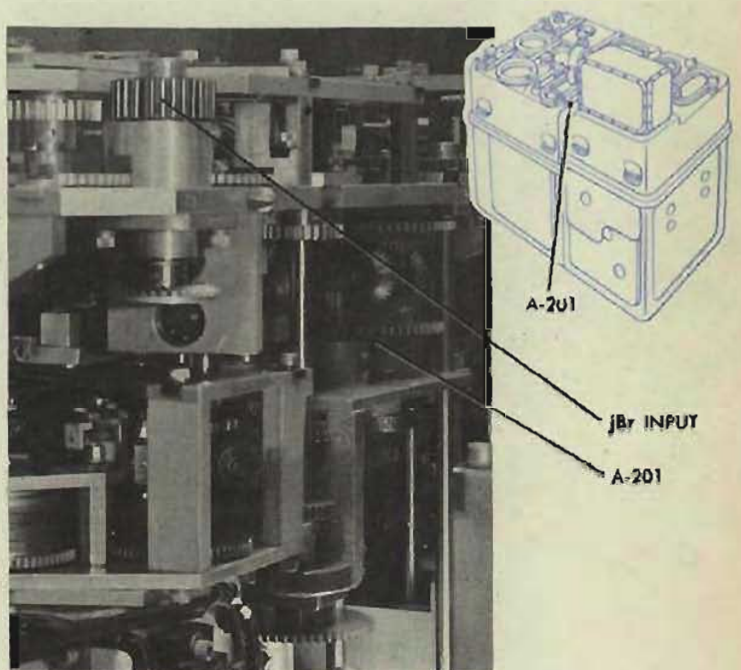
Set *Br* at 0° .
Set *A* at 90° and wedge the line.

Increase *Sh* to 400 knots to offset the carriage of the bearing integrator. The integrator output should not back out the *jBr* input gear.

Adjustment

If any of the integrator output backs through the *jBr* input gear, loosen A-201 and turn the clamp clockwise to increase the friction.

Tighten A-201 and recheck.



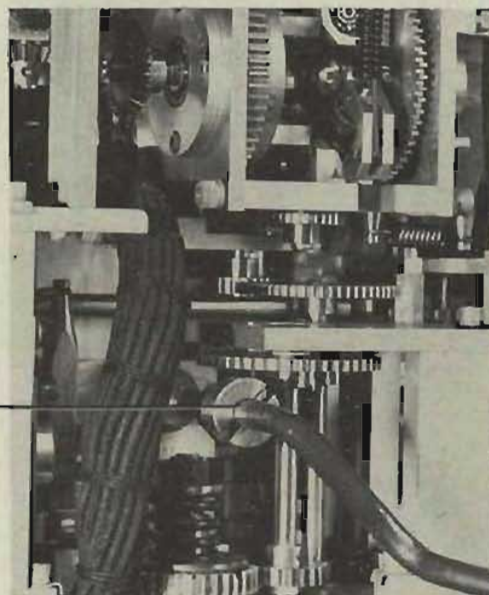
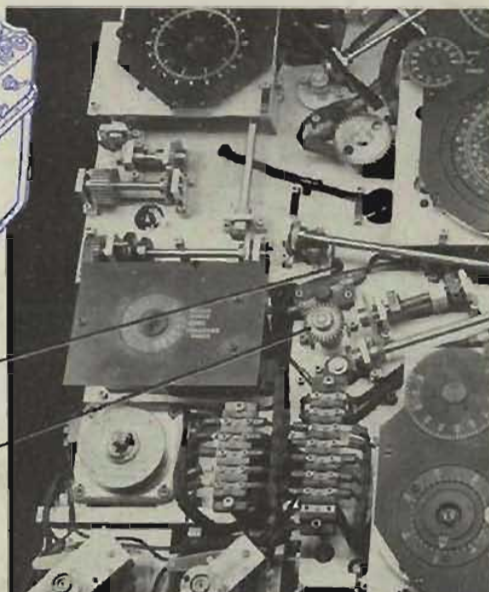
A-202 dH FRICTION DRIVE



A-202

ACCESS TO A-202

Sh INPUT GEAR



CRANK IN dH INPUT COUPLING

Location

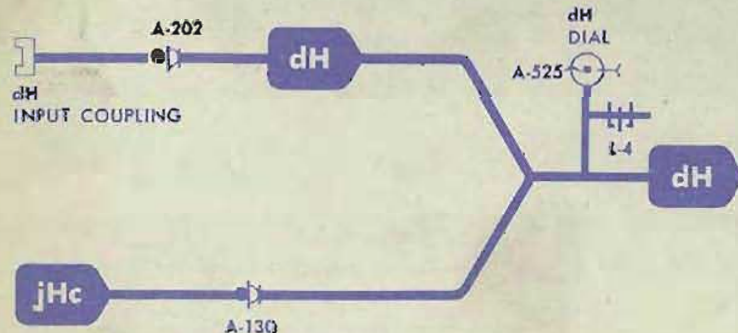
A-202 is under cover 1, on the end of the *dH* input shaft.

Check

A-202 should drive the *dH* line whenever an input is made manually. It should slip when the *dH* line runs against either end of the limit stop.

Turn *dH* rapidly for several revolutions, then slowly, then rapidly again. The *dH* dial should follow the movement of the handcrank closely, without slipping. If the dial moves erratically, the friction drive is too loose.

Run the line into the stop. The friction drive should slip without requiring the handcrank to be forced. If it does not slip with normal turning effort, the friction is too tight.



Adjustment

If the check shows that A-202 is out of adjustment, loosen the screw and turn the clamp clockwise to increase the friction, or counterclockwise to decrease it.

Tighten A-202, and recheck.

A-203 R3 COUNTER to R2 COUNTER

Location

A-203 is under cover 4, at the lower left of the fuze ballistic computer.

Check

FOR SER. NOS. 780 AND LOWER:

Set *Tg* at 0 seconds.

Set *dR* at 0 knots.

The *R3* counter on the fuze ballistic computer should agree with the *R2* counter on the *Tf* ballistic computer.

FOR SER. NOS. 781 AND

HIGHER:

Set *Tg* at 0 seconds.

Disconnect leads A and AA on the *Tf* follow-up, and leads D and DD on the *F* follow-up. Set *F* equal to *Tf*.

Turn the power ON.

Set *So*, *Sh*, and *dH* at 0 knots.

Put the *dR* handcrank at AUTO.

Set *I.V.* at 2550 f.s.²⁵⁶⁰

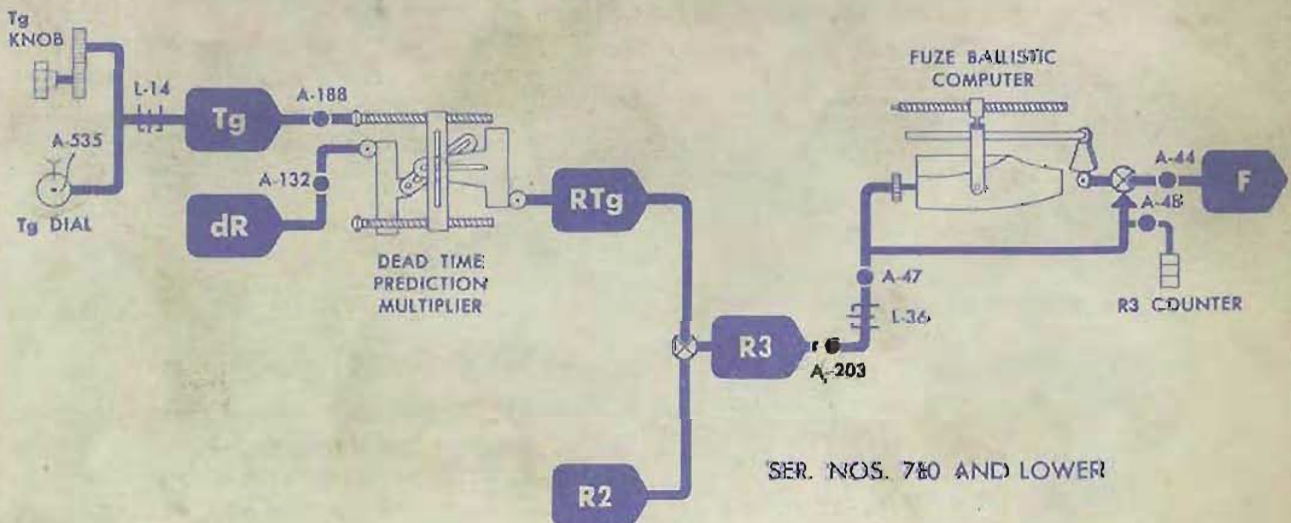
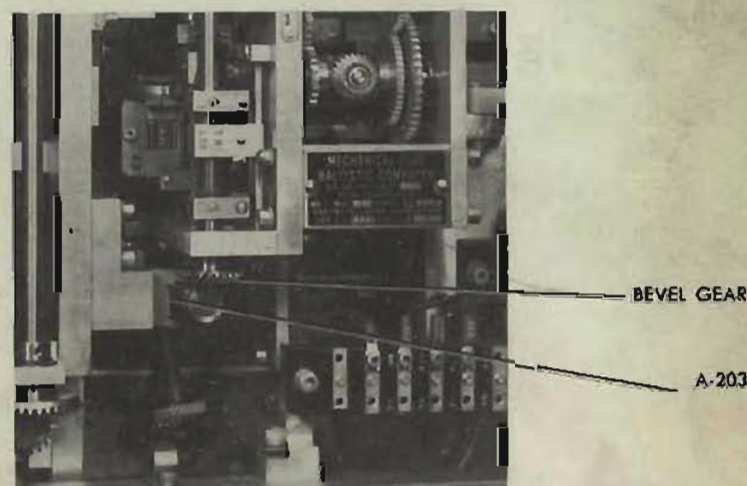
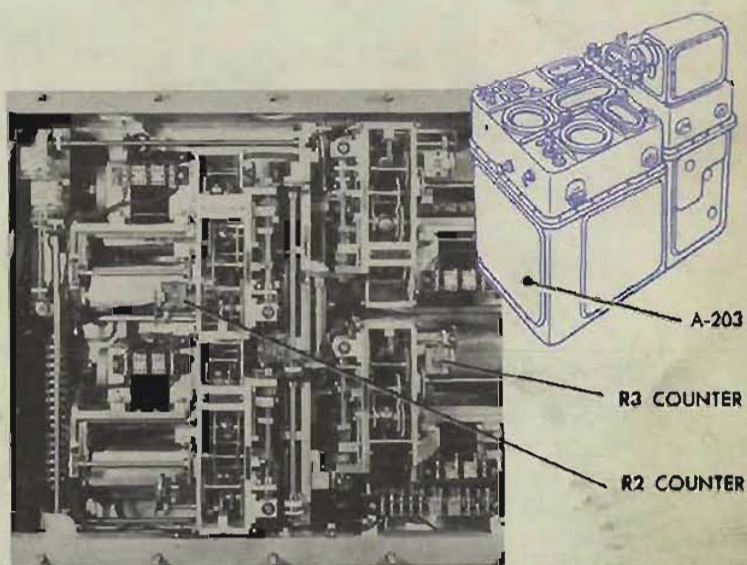
The *R3* counter on the fuze ballistic computer should agree with the *R2* counter on the *Tf* ballistic computer.

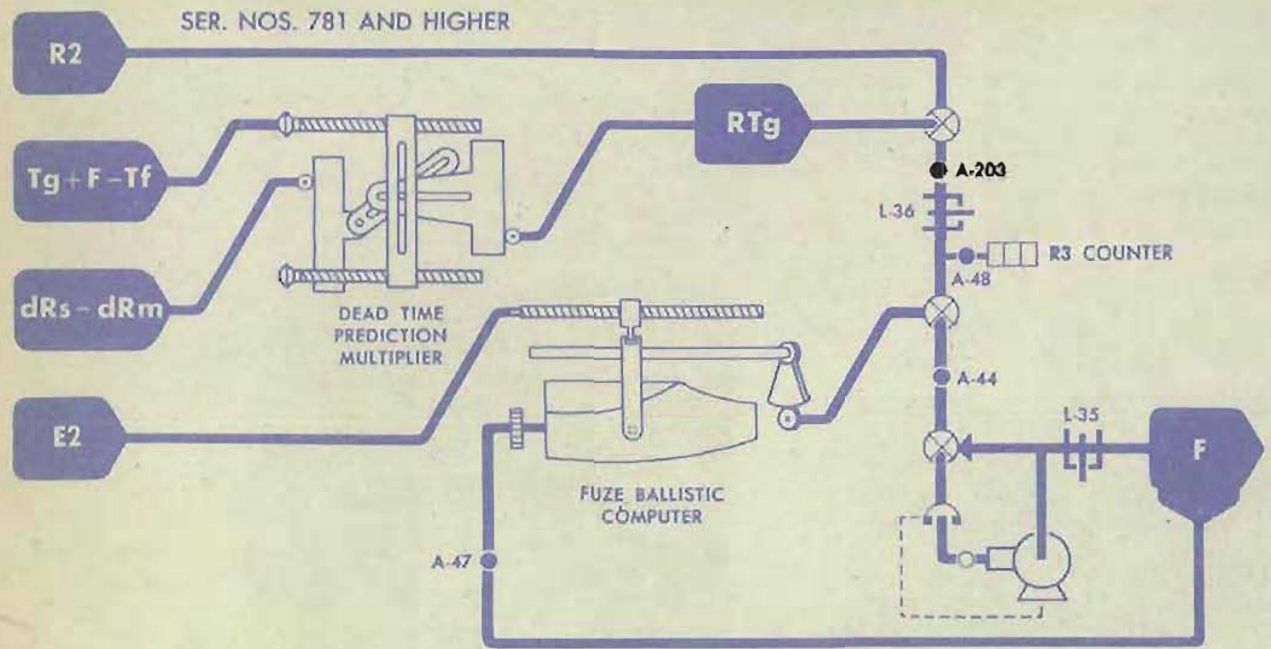
NOTE: Before readjusting A-203, check A-48 and A-47 on Ser. Nos. 780 and lower; check A-48 on Ser. Nos. 781 and higher.

Adjustment

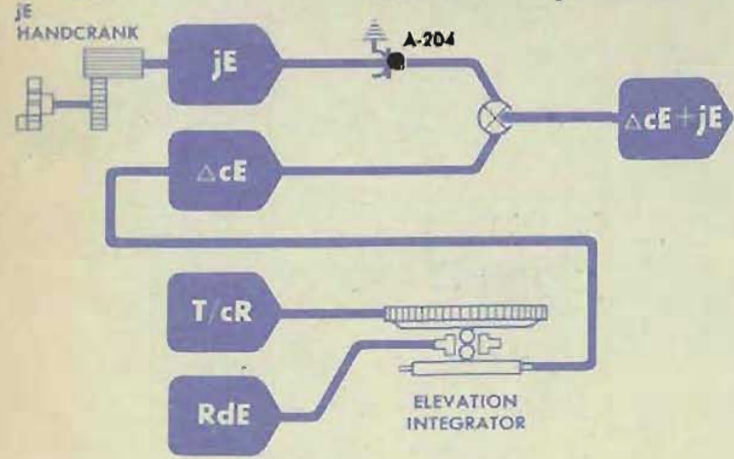
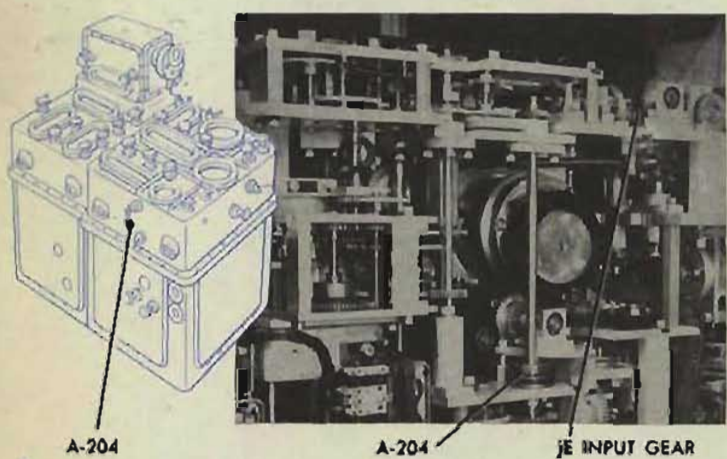
If the counters do not agree, make A-203 slip-tight. Turn the bevel gear in front of A-203 until the *R3* counter reads the same as the *R2* counter.

Tighten A-203, and recheck.





A-204 jE HOLDING FRICTION



Location

A-204 is under cover 1, at the left.

Check

A-204 should hold the jE setting without too much drag on the line.

Turn the time motor ON.

Set E at 0° and increase dH to $+150$ knots to offset the carriage of the elevation integrator. The integrator roller output should not back out the jE input gear.

Adjustment

If A-204 is not properly adjusted, loosen the screw and turn the clamp clockwise to increase the friction. Tighten the screw, and recheck.

A-205 VECTOR SOLVER FRICTION DRIVE

Location

A-205 is under cover 1, at the left center.

Check

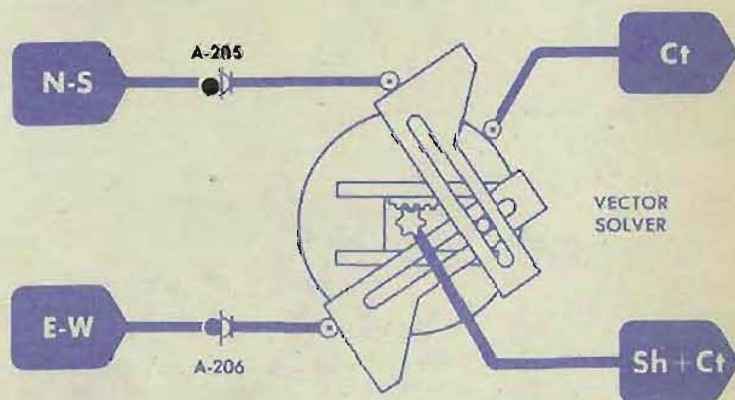
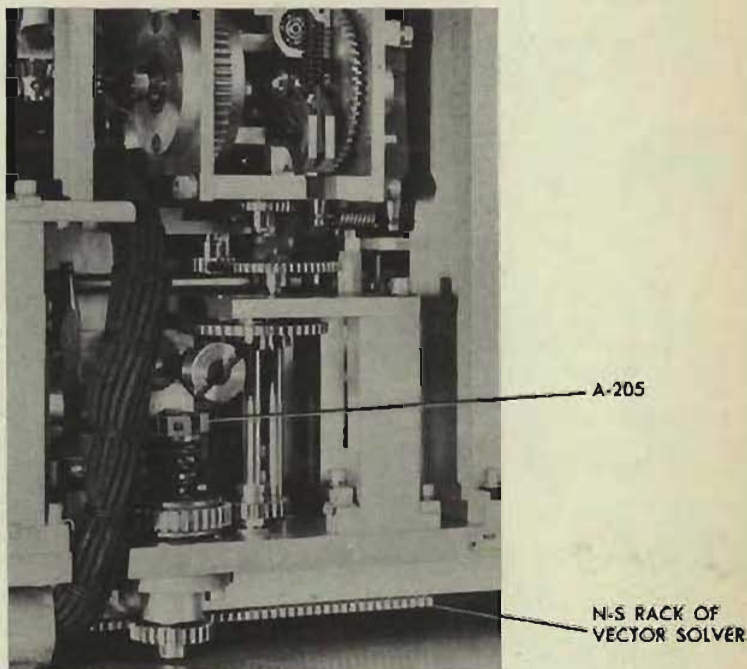
This friction should be tight enough to allow the N-S line to drive the N-S rack and position the vector solver during rate control. It should slip, however, when *Sh* or *Ct* is introduced manually.

Adjustment

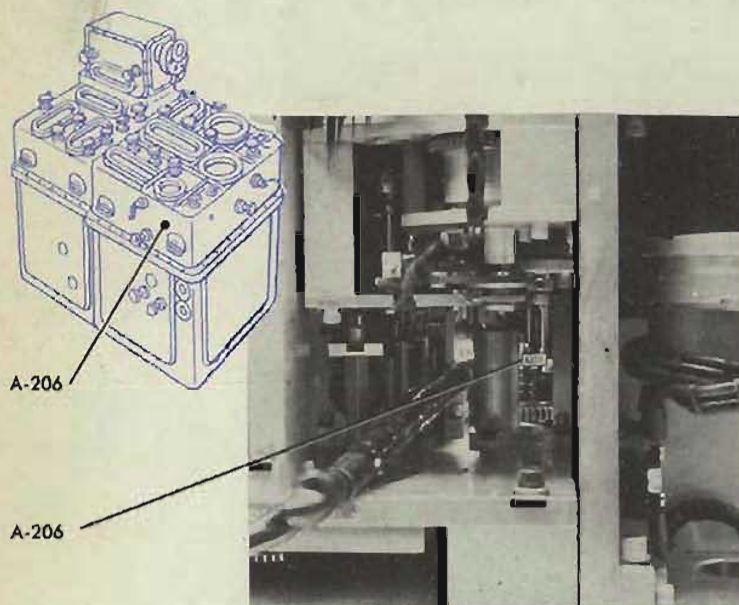
Loosen A-205 and turn the threaded clamp until it barely touches the washer below it. Then turn the clamp clockwise $3\frac{1}{2}$ turns, thereby compressing the spring. Tighten the screw and recheck.

Note

The friction loads on A-205 and A-206 should be equal.



A-206 VECTOR SOLVER FRICTION DRIVE



Location

A-206 is located under cover 1, at the front of the vector solver.

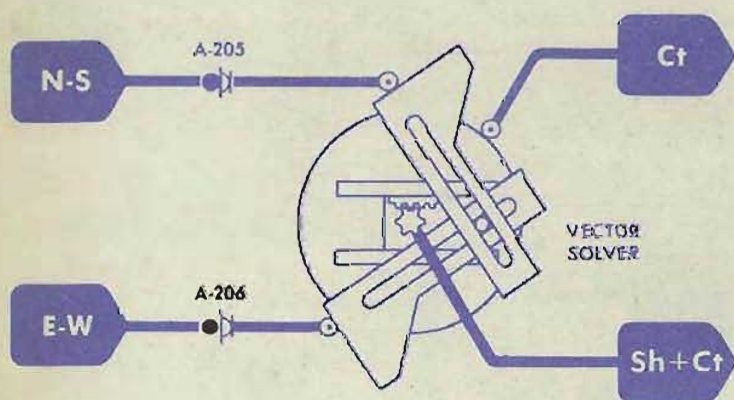
Check

This friction should be tight enough to allow the E-W line to drive the E-W rack and position the vector solver during rate control. It should slip, however, when *Sh* or *Ct* is introduced manually.

Adjustment

Loosen A-205 and turn the threaded clamp until it barely touches the washer below it. Then turn the clamp clockwise $3\frac{1}{2}$ turns, thereby compressing the spring.

Tighten the screw, and recheck.



Note

The friction loads on A-206 and A-205 should be equal.

A-207 ASSEMBLY CLAMP

Location

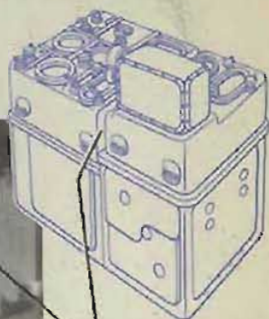
A-207 is under cover 1 at the rear, on the spur gear of the *jBr* clutch.

Check

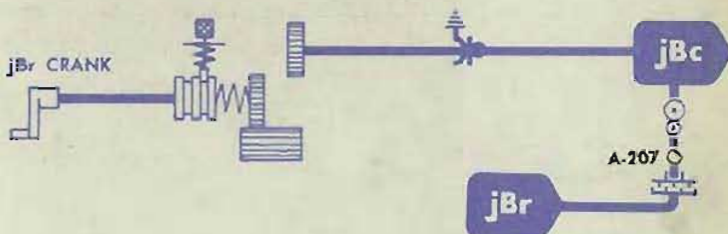
A-207 should be tight.

Adjustment

Tighten A-207. No further adjustment is necessary.



ACCESS TO A-207



A-208 Z_d·D_s MULTIPLIER to D_s COUNTER

Location

A-208 is under cover 8. It can be reached through the access hole above the damper of the *jB'r* follow-up, under cover 7.

Older instruments do not have this access. On these computers, A-208 may be adjusted with a geared screw driver inserted under cover 8.

Check

Turn the power ON.

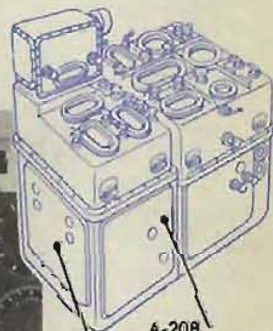
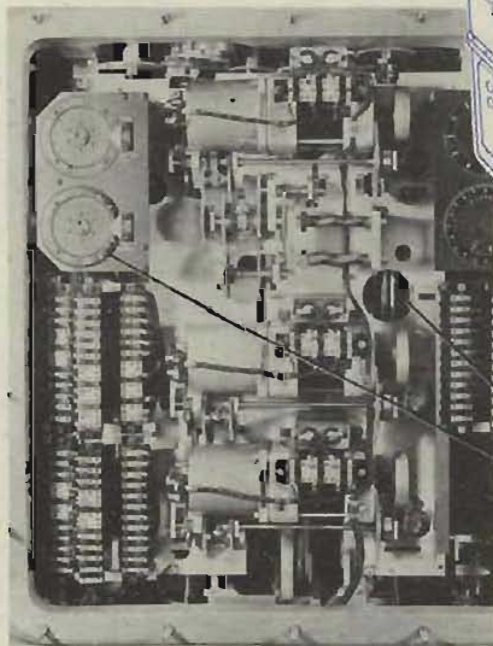
Set *D_s* at 500 mils.

Set *V_s* at 2000'.

Set *L* at 2000'.

Set *E* at 0' with the sync *E* handcrank at CENTER.

Match the sync *E* dials at the fixed index with the handcrank OUT.



A-208
12 INCHES IN

ACCESS TO A-208

ACCESS TO A-208

V_Z DIALS

Full travel of Zd should cause no motion of the output rack of the $Zd \cdot Ds$ multiplier.

Motion of the $Zd \cdot Ds$ output rack can be observed on the Vz dials. The dials should not move for full travel of Zd .

Adjustment

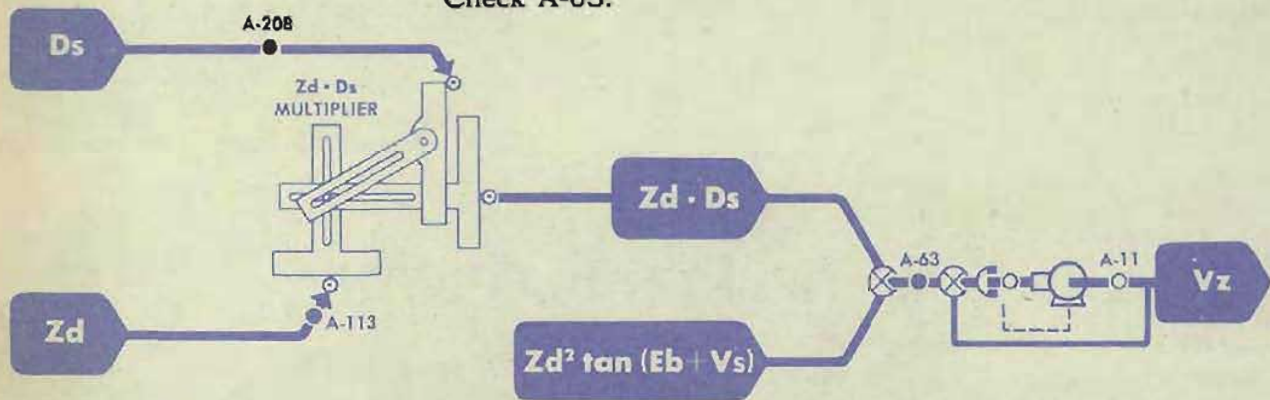
If the Vz dials move, make A-208 slip-tight.

CAUTION

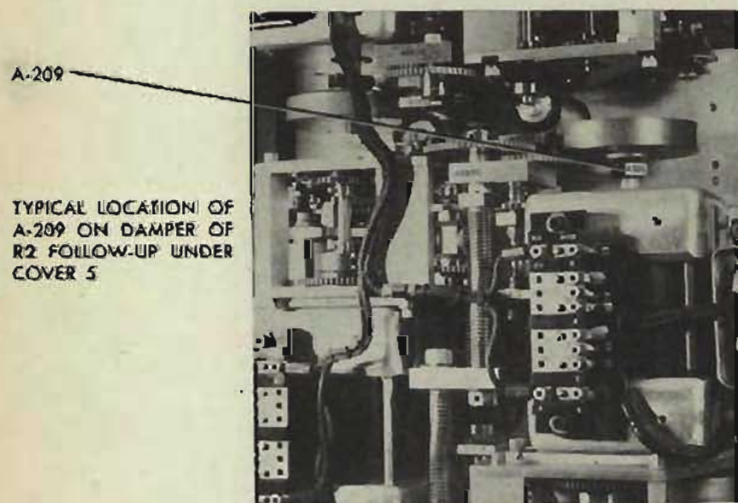
While making A-208 slip-tight, hold the Ds input rack to prevent its falling and causing damage.

Offset Ds to locate the zero position of the Ds input rack. When there is no motion of the Vz dials for full travel of Zd , hold the small spur gear on the same shaft as A-208, and bring the Ds counter back to 500 mils with the handcrank.

Tighten A-208, and recheck.
Check A-63.



A-209 ASSEMBLY CLAMPS



TYPICAL LOCATION OF A-209 ON DAMPER OF R2 FOLLOW-UP UNDER COVER 5

Location

A-209 is the assembly clamp that holds each magnetic damper to its associated servo shaft. There is a magnetic damper and a clamp A-209 on each of the following servo motor shafts:

Under cover 1: $RdE, dRh, RdBs, dR, Sh, Ct, jdR, jE, jBr$

Under cover 3: $WrD + KRdBs$

Under cover 4: $F, Tf, Vi + Pe, Tl/R2$

Under cover 5: $Ywgr, R2, V, Dtwj, Co$

Under cover 6: Eb, Eb booster

Under cover 7: $Dd, Vz, jB'r, B'r$ local control

Under cover 8: $B'r$ receiver

A-209 is also located on the large damper on the bearing filter under cover 3.

Check

If A-209 is loose, the damping action of the damper is lacking, and the damper may slip along the shaft to cause interference with other assemblies. A follow-up with a loose damper may oscillate or come to a slow stop, after wandering back and forth past the synchronizing point. Check that A-209 is tight and the damper is located so that it causes no interference with any part of the mechanism.



Adjustment

Tighten A-209.

A-210 SECANT E CAM to E DIALS

Location

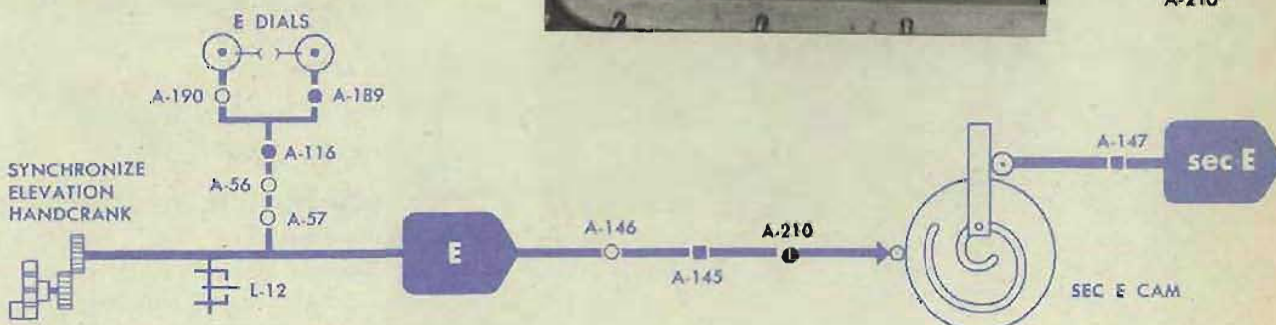
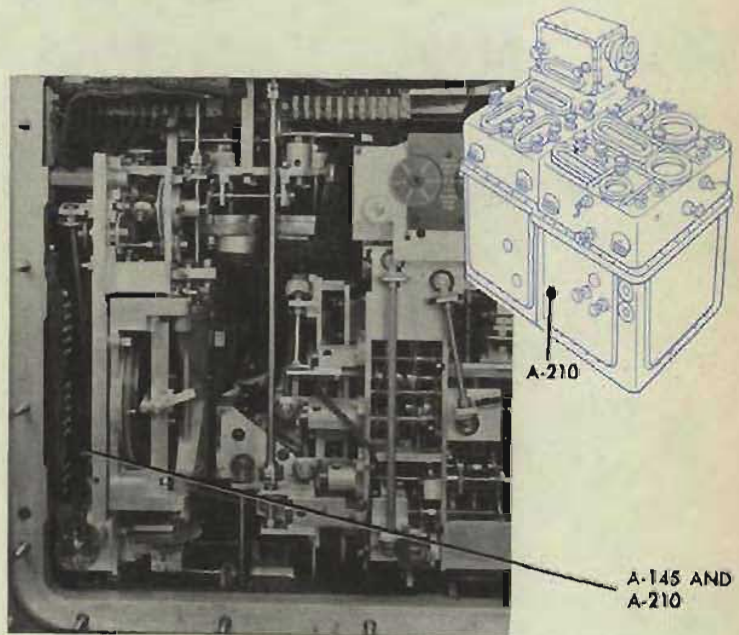
A-210 is under cover 3, behind the integrator mounting plate. A-210 is on computers with Ser. Nos. 389 and lower. It is replaced by A-146 on Ser. Nos. 390 and higher.

Check

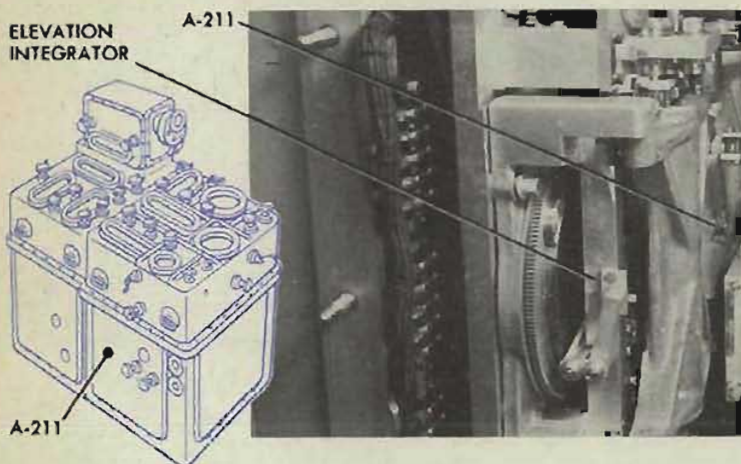
Check that A-210 is tight, and A-145 is in adjustment.

Adjustment

Follow the readjustment procedure for A-146. Tighten A-210, and readjust A-145.



A-211 ASSEMBLY CLAMP



Location

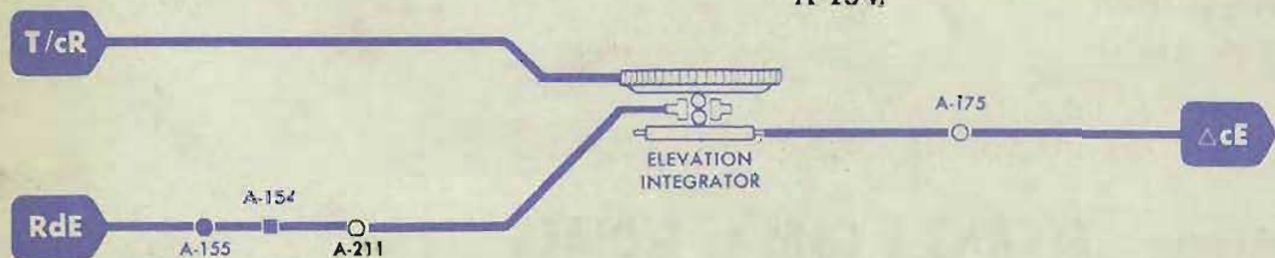
A-211 is under cover 3, on a large spur gear near the elevation integrator.

Check

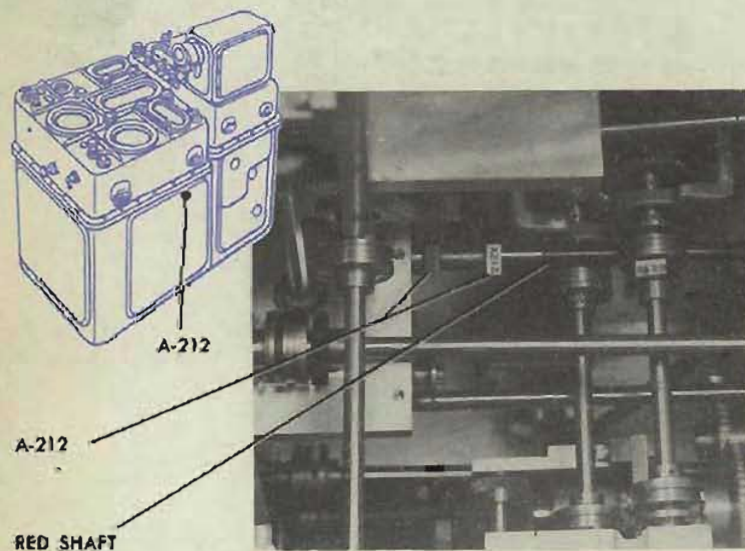
A-211 should be tight enough to prevent the elevation integrator carriage from slipping through the clamp to move off its setting.

Adjustment

Tighten A-211. Readjust A-155 and A-154.



A-212 So DIAL to So RECEIVER



Location

A-212 is under cover 5, about 14 inches in, on the front end of a red shaft.

A-212 is a sleeve coupling with a clamp on either end.

A-212 is omitted on Mod 0.

Check

Turn So from limit to limit with the So handcrank IN, to make sure that the So limit-stop adjustment is not upset.

Shift the So handcrank to the OUT position.

Turn the power ON.

Transmit So from the pitometer log to the computer.

The So dial should read the same value as that being transmitted from the pitometer log.

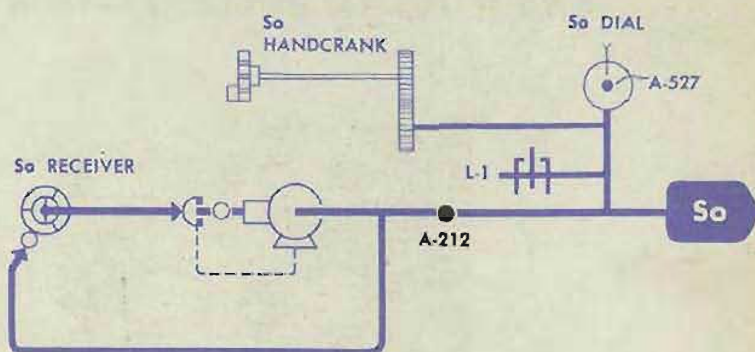
Adjustment

If the *So* dial does not match the pitometer log value, loosen A-212. Bring the *So* dial to the matching value, with the *So* handcrank IN. Shift the handcrank to the OUT position. The *So* dial should stay at the correct value. If it does not, shift the handcrank to the IN position and correct until it does.

Tighten A-212 and check *So* transmission at two or three different values.

Note

Both clamps A-212 on the sleeve coupling must be tight.



A-213 COARSE to FINE SYNCHRO - Ds DOUBLE-SPEED TRANSMITTER

Location

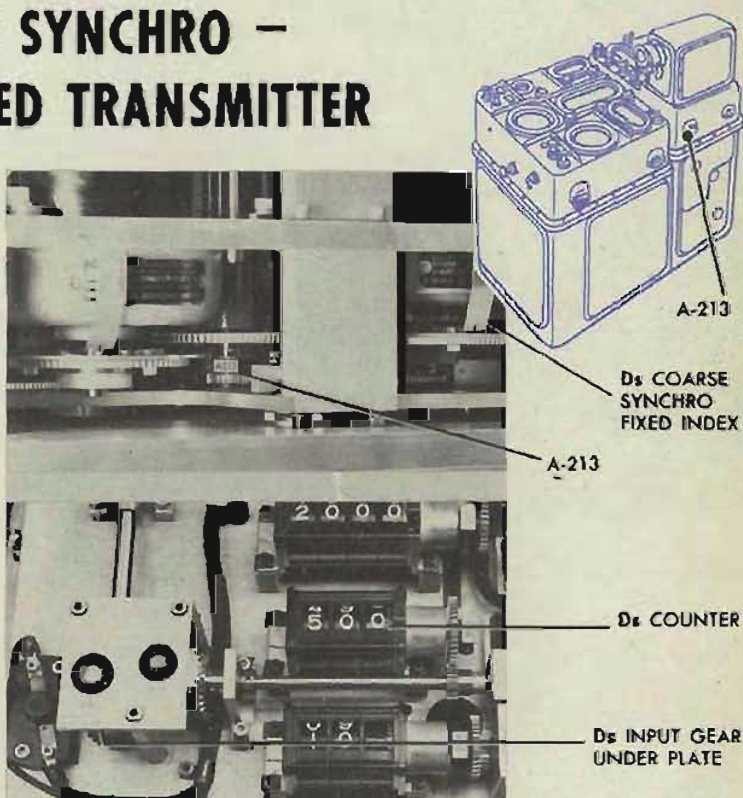
A-213 is under cover 2. It is omitted on Mods 0, 2, and 6.

Check

Set the coarse *Ds* synchro at electrical zero, using the *Ds* input gear.

The fine *Ds* synchro should also be at electrical zero.

Both synchros are at electrical zero when the scribe marks on their rotors are matched with the fixed index marks.



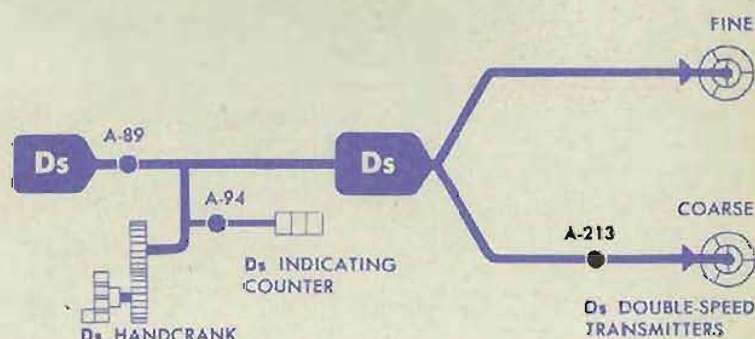
Adjustment

If the fine synchro is not at electrical zero, make A-213 slip-tight.

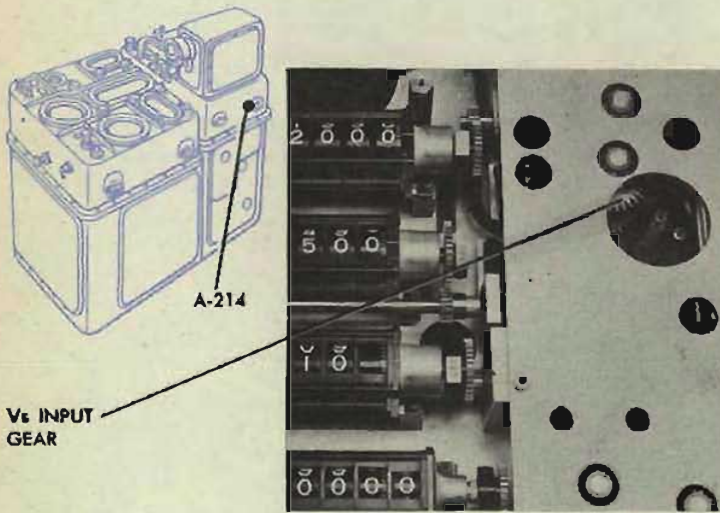
Hold the large gear on the rotor of the coarse synchro.

Turn the *Ds* input gear until the fine synchro is at electrical zero.

Tighten A-213 and recheck.



A-214 COARSE to FINE SYNCHRO — Vs DOUBLE-SPEED TRANSMITTER



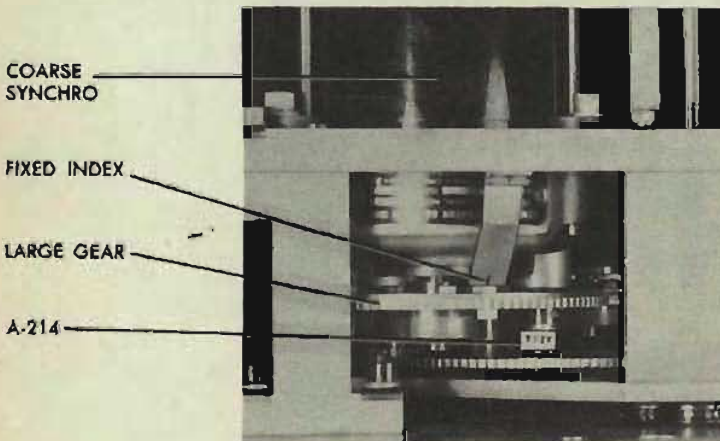
Location

A-214 is under cover 2, below and to the right of the fine Vs synchro. A-214 is omitted on Mods 0, 2, and 6.

Check

Set the coarse Vs synchro at electrical zero, using the Vs input gear.

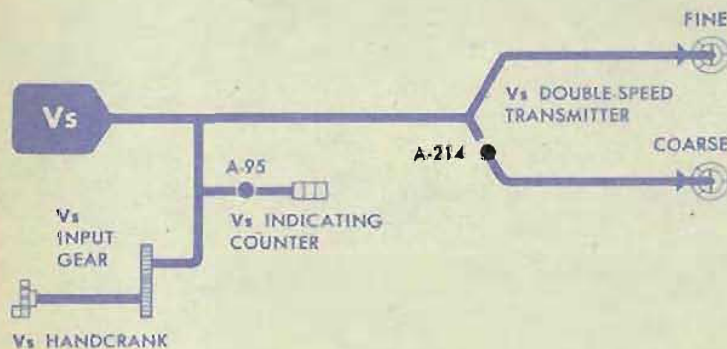
The fine Vs synchro should also be at electrical zero. Both synchros are at electrical zero when the scribe marks on their rotors are matched with the fixed index marks.



Adjustment

If the fine synchro is not at electrical zero, make A-214 slip-tight.

Hold the large gear, which meshes with the gear above A-214, to keep the coarse synchro at electrical zero.



Turn the Vs input gear until the fine synchro is at electrical zero.

Tighten A-214 and recheck.

A-215 LOST MOTION TAKE-UP SPRING on jDd LINE

Location

A-215 is under cover 7, above the jB'r follow-up capacitor.

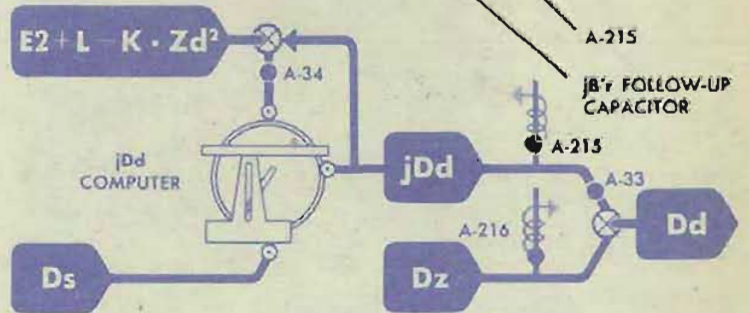
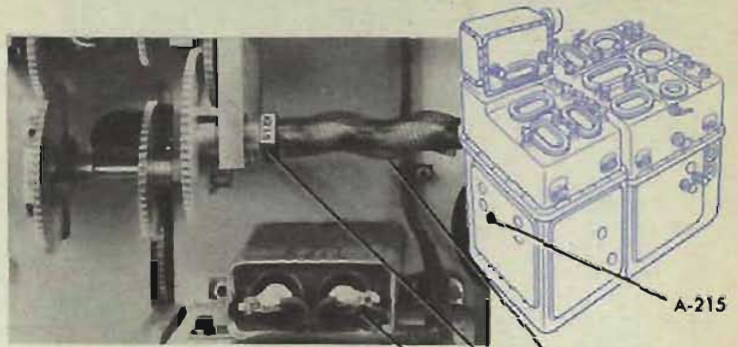
Adjustment

Turn the power ON.
Set Ds at 500 mils.

Loosen the clamp and allow the spring to unwind.

Wind the spring three revolutions by turning the clamp.

Tighten the screw.
Check A-33.



A-216 LOST MOTION TAKE-UP SPRING on Dz LINE

Location

A-216 is under cover 7, at the end of the spring 2 inches below the Dd follow-up.

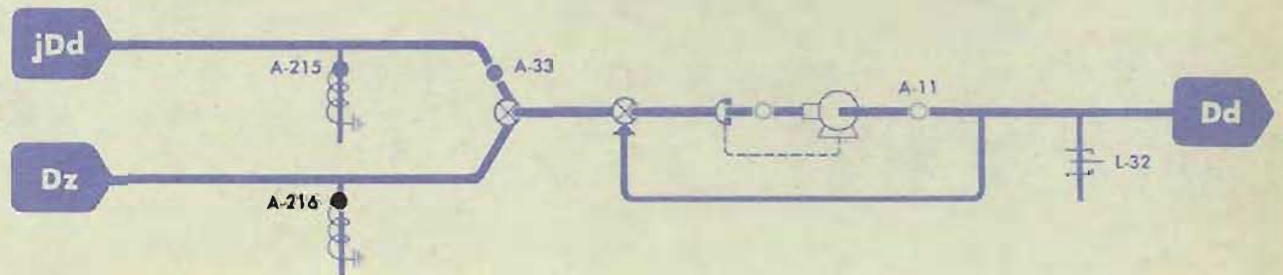
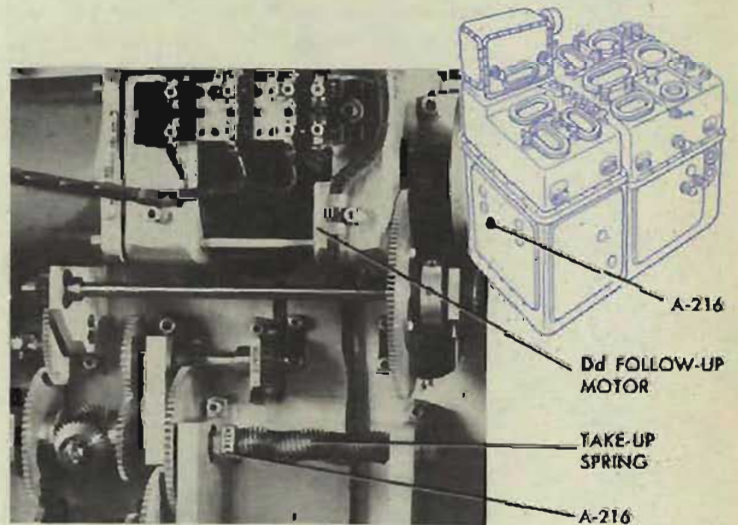
Adjustment

Turn the power ON.
Set Zd at 2000'.

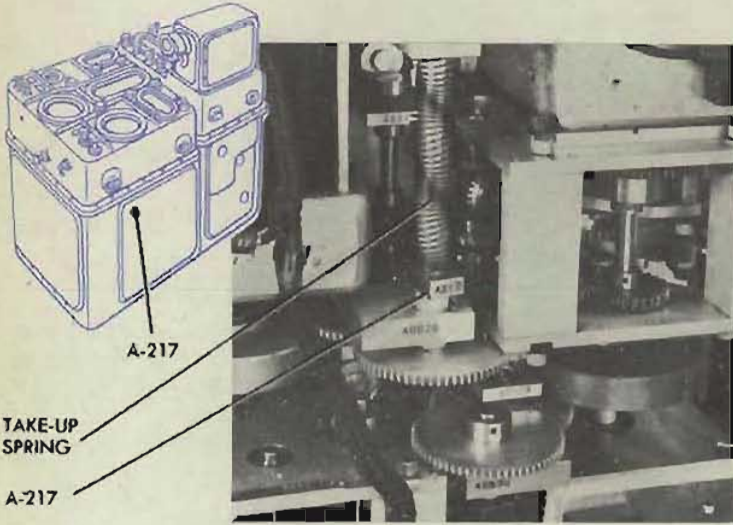
Loosen the clamp and allow the spring to unwind.

Wind the spring three revolutions by turning the clamp.

Tighten the screw.
Check A-33.



A-217 LOST MOTION TAKE-UP SPRING on Dtwj LINE



Location

A-217 is under cover 5.

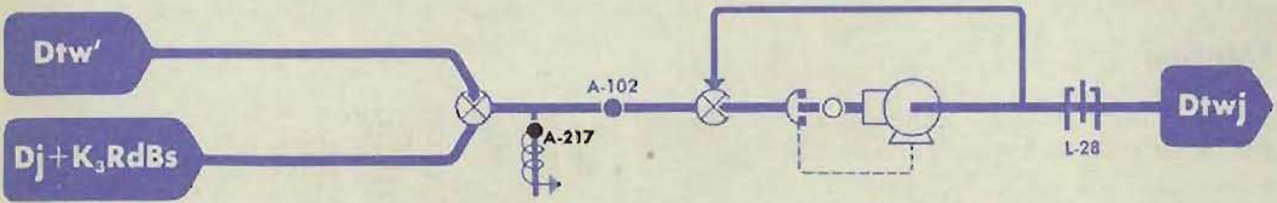
Adjustment

Turn the power ON.
Set S_o , S_h , S_w , and D_j at 0.

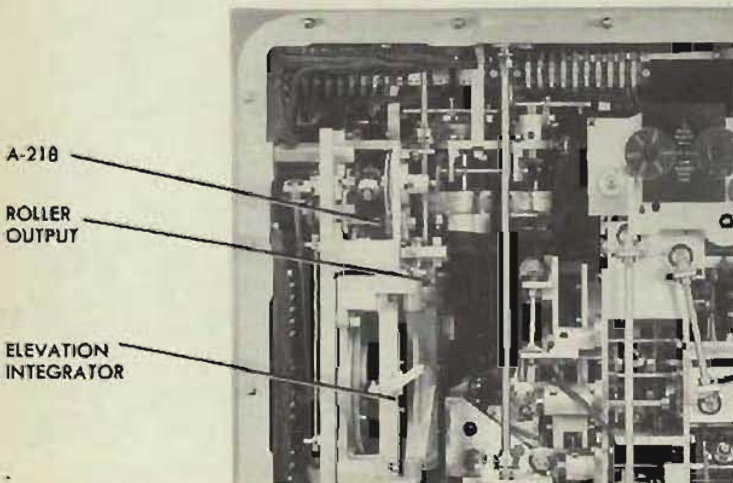
Loosen the clamp and allow the spring to unwind.

Wind the take-up spring three revolutions counterclockwise (looking down) by turning the clamp.

Tighten A-217.
Check A-102.



A-218 ASSEMBLY CLAMP



Location

A-218 is under cover 3, on a spur gear in the output gearing of the elevation integrator.

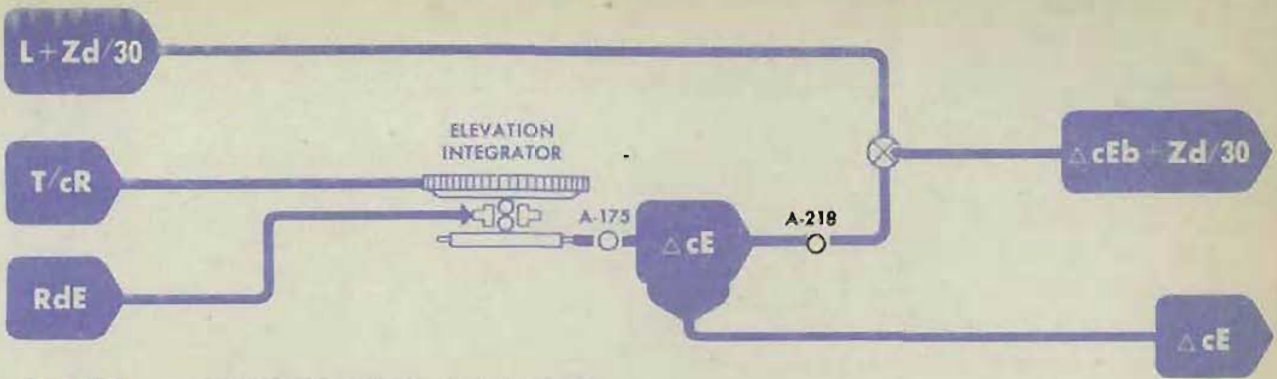
A-218 is omitted on Mod 0.

Check

Check that A-218 is tight.

Adjustment

Tighten A-218.



A-219 ASSEMBLY CLAMP

Location

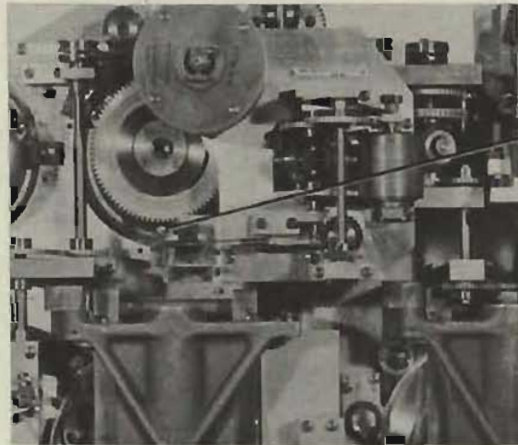
A-219 is under cover 3, above the sec E integrator, on the $\Delta cB'r$ gearing. A-219 is omitted on Mod 0.

Check

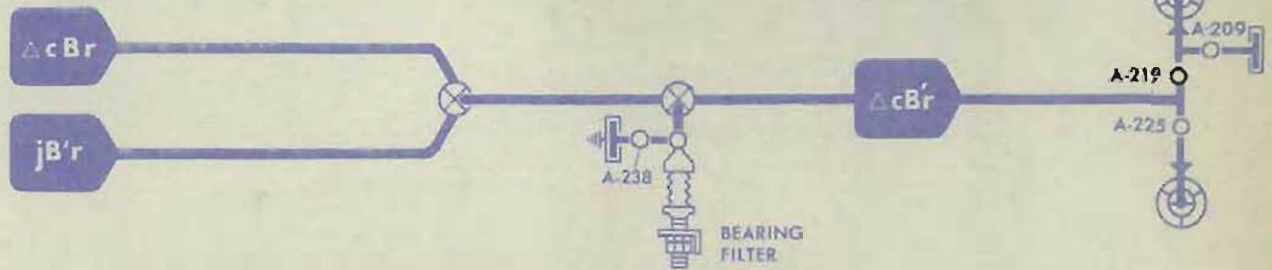
Check that the $\Delta cB'r$ auto transmitter rotor gear cannot be turned when the $\Delta cB'r$ line is held.

Adjustment

Tighten A-219.



INTEGRATOR GROUP REMOVED FROM THE COMPUTER



A-220 LOST MOTION TAKE-UP SPRING on R2 LINE

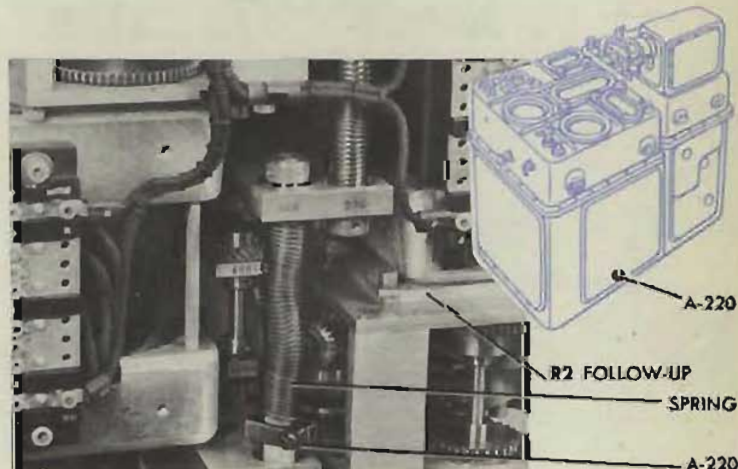
Location

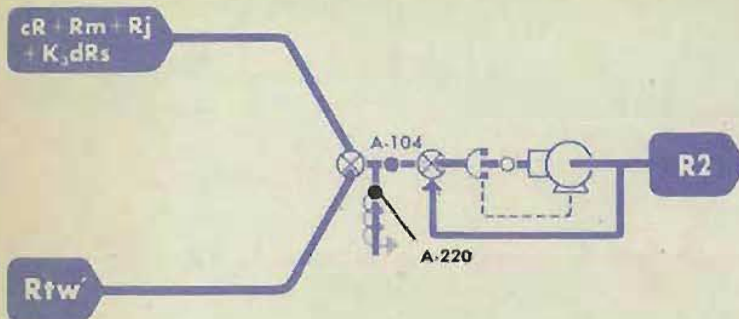
A-220 is under cover 5, in front of the R2 follow-up control.

Adjustment

- Turn the power ON.
- Set S_o , S_h , S_w , and dH at 0 knots.
- Set R_j at 0 yards.
- Set $I.V.$ at 2550 f.s.
- Set cR at 2000 yards.

Loosen the clamp and allow the spring to unwind.

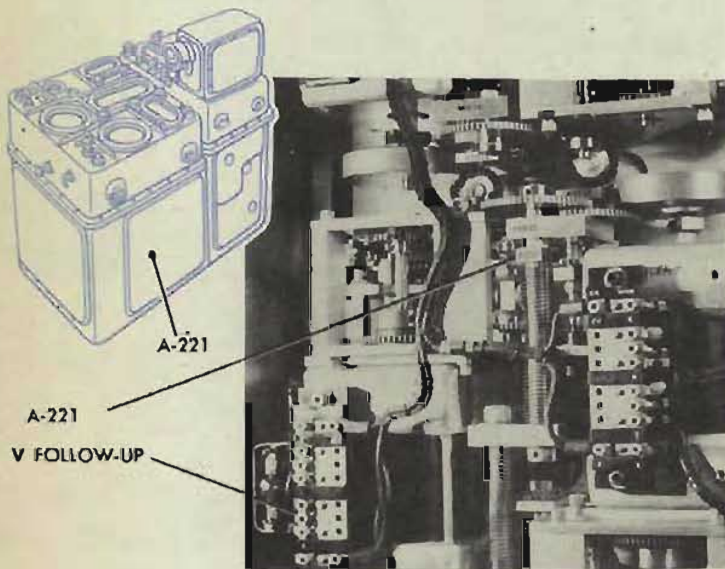




Wind the take-up spring three revolutions counterclockwise (looking down) by turning the clamp.

Tighten the screw.
Check A-104.

A-221 LOST MOTION TAKE-UP SPRING on V LINE



Location

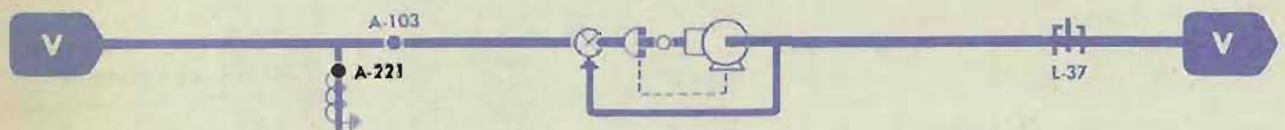
A-221 is under cover 5, at the upper end of the spring near the V follow-up.

Adjustment

Turn the power ON.
Set S_o , S_h , S_w , and dH at 0 knots.
Set D_s at 500 mils and V_j at 0 mils.

Loosen the clamp and allow the spring to unwind.
Wind the take-up spring three revolutions clockwise (looking down) by turning the clamp.

Tighten A-221.
Check A-103.



A-222 jEc HOLDING FRICTION

Location

A-222 is under cover 1, at the top left.

Check

This friction should hold the jEc setting without too much drag on the line.

Set E at 45° .

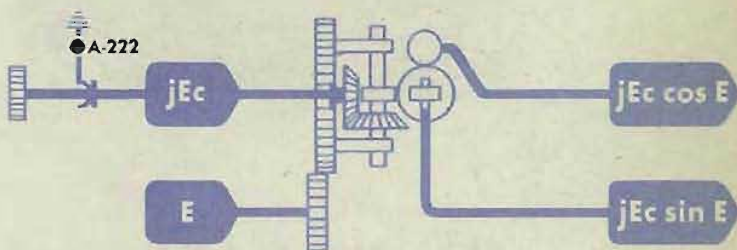
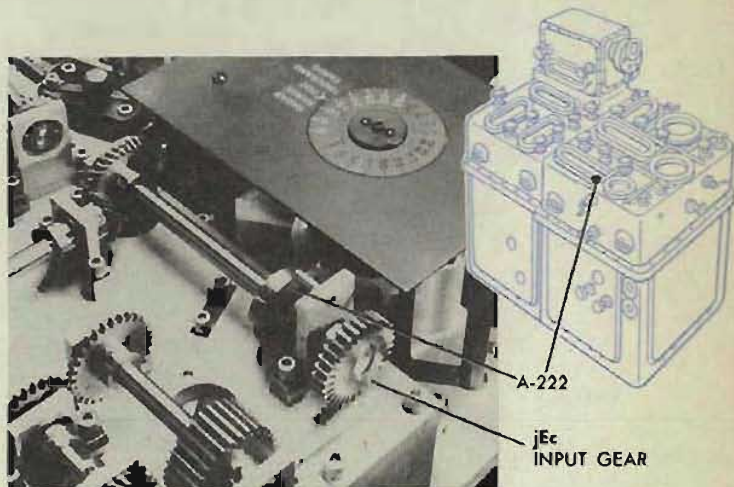
Introduce rapid range rate corrections into the rate control group.

No motion of jdR should back through the jEc line.

Adjustment

If any motion of jdR moves the jEc input gear, loosen A-222 and turn the clamp clockwise to increase the friction.

Tighten A-222, and recheck.



A-223 jBc HOLDING FRICTION

Location

A-223 is under cover 1. It can be reached through the access hole to the rear of the fine Br dial.

Check

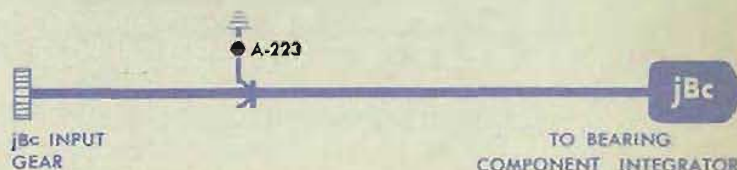
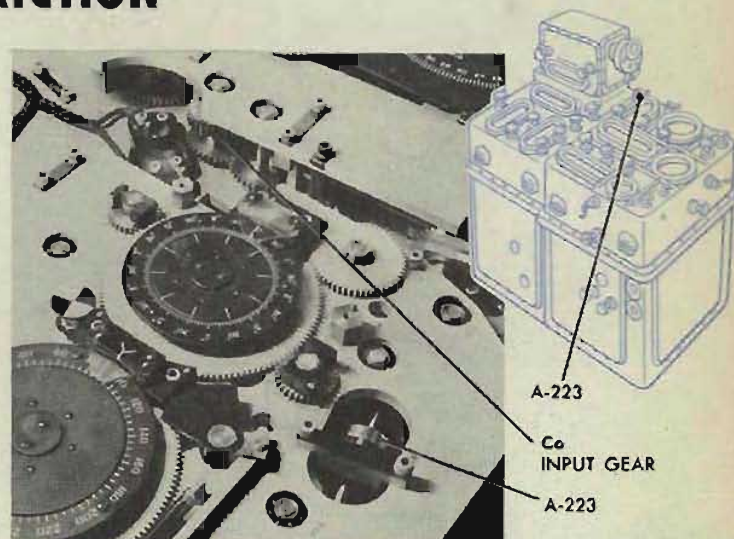
This friction should hold the jBc setting without too much drag on the line.

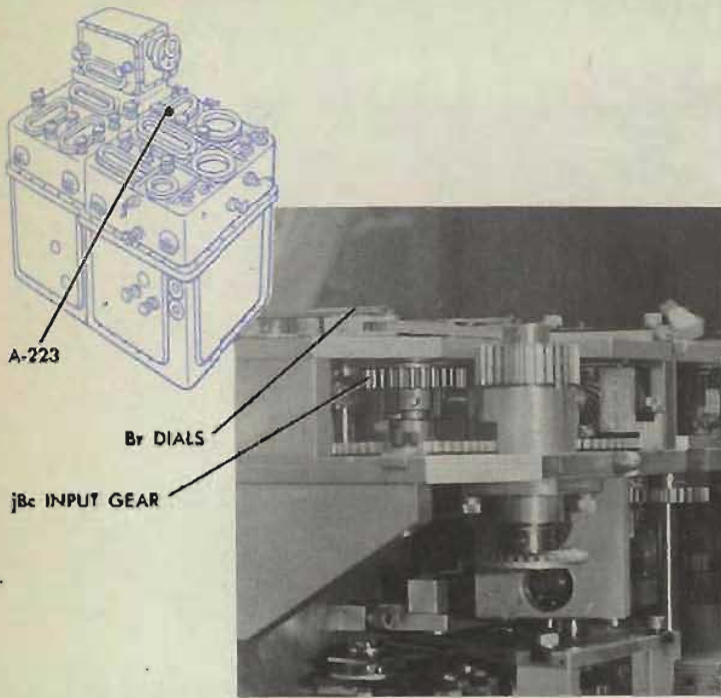
Set B at 45° .

Set E at 0° .

Introduce rapid range rate corrections into the rate control group.

No motion of $jdRh$ should back through the jBc line.



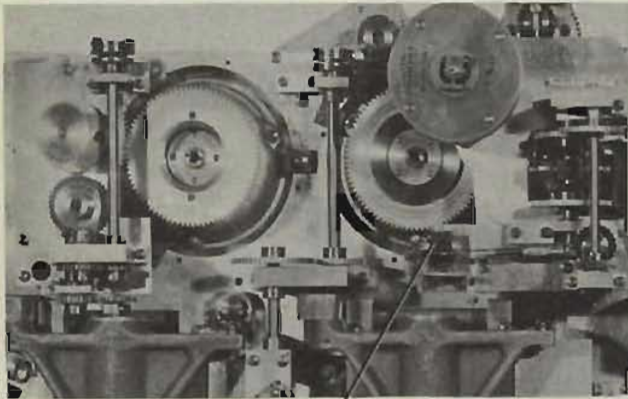


Adjustment

If the jBc input gear moves, loosen A-223 and turn the clamp clockwise to increase the friction.

Tighten A-223 and recheck.

A-225 ASSEMBLY CLAMP



A-225
INTEGRATOR ASSEMBLY REMOVED
FROM INSTRUMENT

Location

A-225 is under cover 3, on the same shaft as A-219.

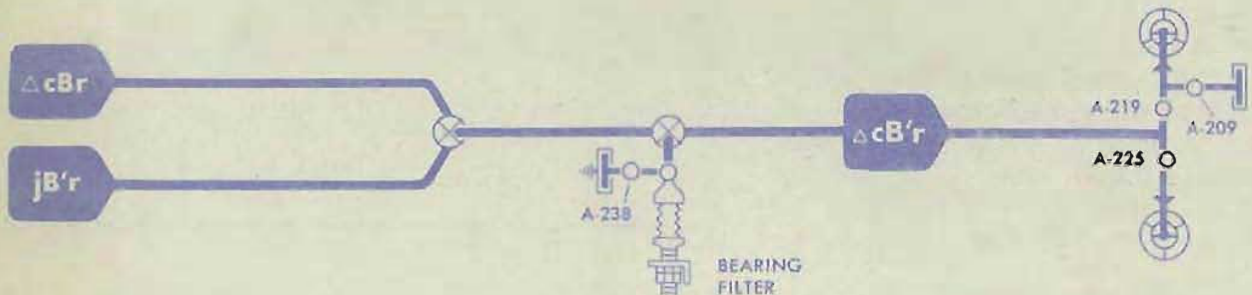
It is omitted on Mod 0.

Check

Check that the $\Delta cB'r$ indicating transmitter rotor gear cannot be turned when the $\Delta cB'r$ line is held.

Adjustment

Tighten A-225.



A-226 Pv COMPUTER to PARALLAX COMPONENT SOLVER

Location

A-226 is under cover 7, directly behind terminal 131.

A-226 is omitted on Mods 0-4, 6, 9, and 10.

The $(\cos B'gr)/R2$ rack of the Pv computer is below A-226.

Check

Turn the power OFF.

Set Dd at 0° and wedge the line.

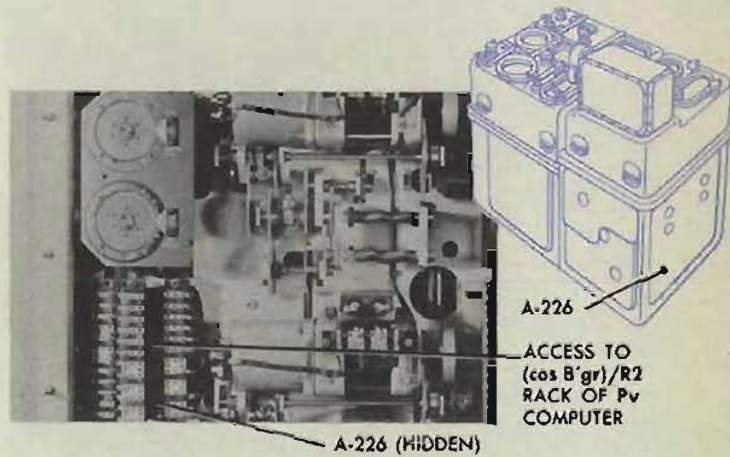
Set $B'gr$ at 90° and wedge the line.

Set $R2$ at 18,000 yards.

The $(\cos B'gr)/R2$ rack of the Pv computer should be at its zero position.

Turn $E2$ from 0° to 85° .

The Pv dial should not move.



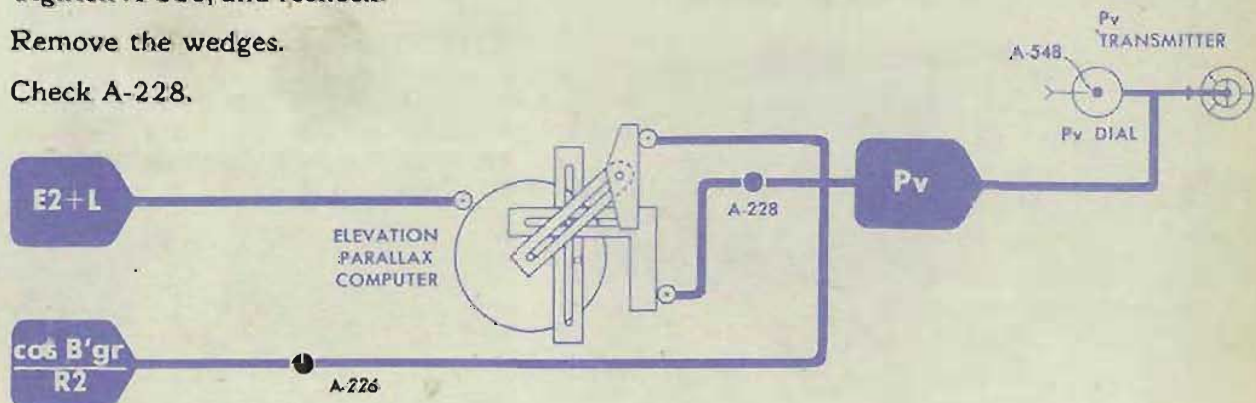
Adjustment

If the Pv dial moves, make A-226 slip-tight. Use a gear pusher to move the $(\cos B'gr)/R2$ input rack until its zero position is found. This will be the position where full travel of $E2$ causes no motion of Pv.

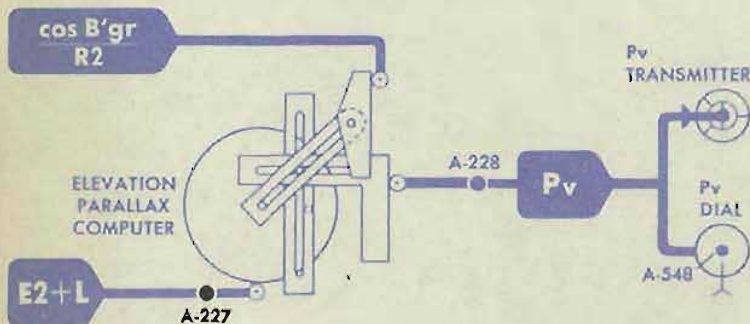
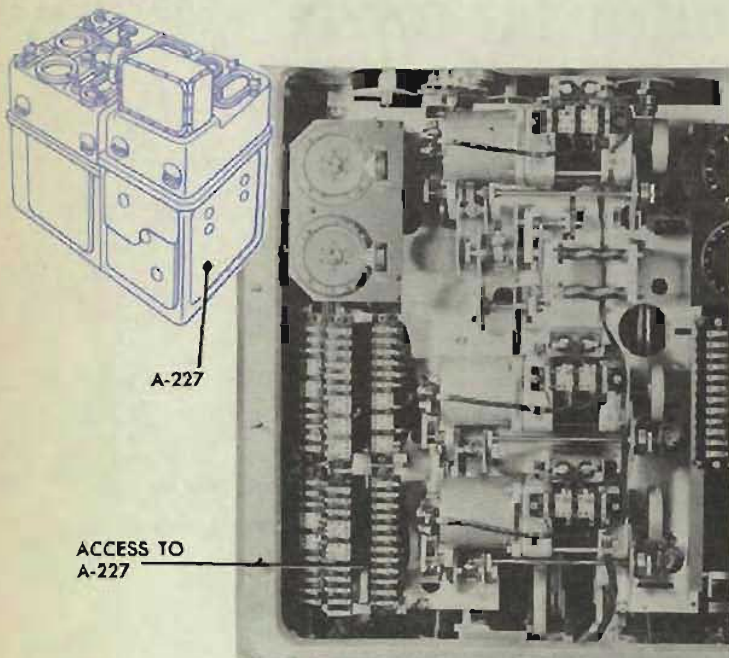
Tighten A-226, and recheck.

Remove the wedges.

Check A-228.



A-227 Pv COMPUTER to E2 + L LINE



Location

A-227 is under cover 7, below the *Pv* computer. It can be seen by looking down at an angle past the lower end of the coarse *E'g* indicating transmitter.

A-227 is omitted on Mods 0-4, 6, 9, and 10.

Check

Set *E2* at 0°.

Set *L* at 2000'.

The sin (*E2* + *L*) cam should be at its zero position, where any movement of the (cos *B'gr*)/*R2* input rack causes no motion of the *Pv* dial.

Wedge *B'gr* and *Dd* at 0°, and decrease *R2* from 18,000 to 500 yards. The *Pv* dial should not move.

Adjustment

If the *Pv* dial moves, make A-227 slip-tight.

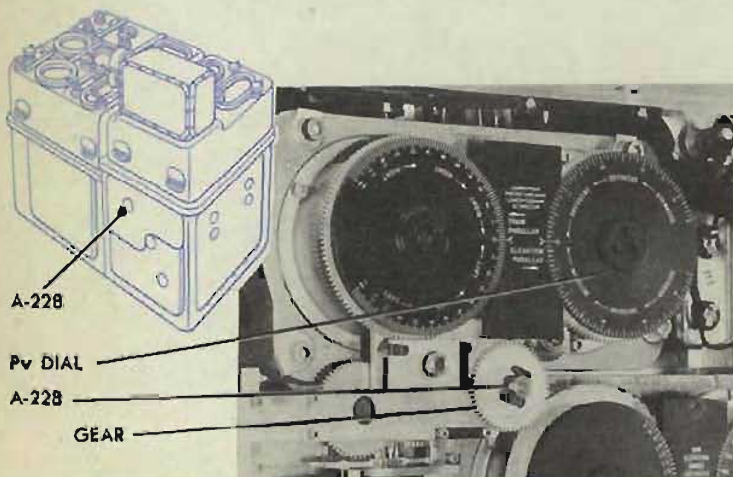
Position the sin (*E2* + *L*) cam until there is no motion of the *Pv* dial for full travel of the (cos *B'gr*)/*R2* rack. The sin (*E2* + *L*) cam is one inch to the right of A-227 and may be moved with a gear pusher.

Tighten A-227, and recheck.

Remove the wedges.

Check A-228.

A-228 Pv DIAL to Pv COMPUTER



Location

A-228 is under cover 6, below the end of the mask for the *Ph* and *Pv* dials. A-228 is omitted on Mods 0-4, 6, 9, and 10.

Check

Turn the power OFF.

Set $E2$ at 0° .

Set L at 2000'.

Set Dd at 0° and wedge the line.

Set $B'gr$ at 90° and wedge the line.

The Pv dial should read 0° .

Adjustment

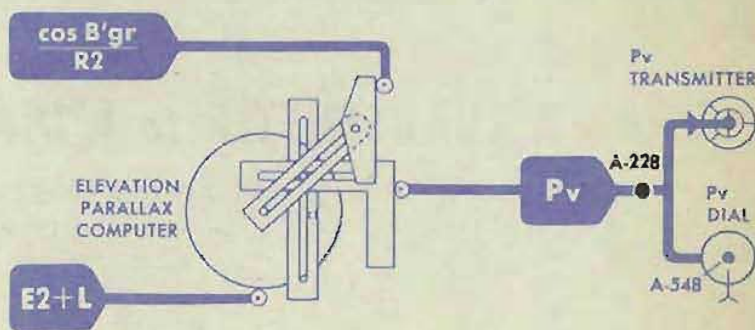
If the Pv dial does not read 0° , make A-228 slip-tight.

Slipping through A-228, turn the gear next to the clamp until the Pv dial is at 0° .

Tighten A-228, and recheck.

Remove the wedges.

Check A-548.



A-229 STAR SHELL DEFLECTION COUNTER to $WrD + KRdBs$ LINE

Location

A-229 is under cover 3.

A-229 is omitted on Mods 0, 1, 2, 3, 9, and 10.

Check

Turn the power ON.

Set Sh , So , and Sw at 0 knots.

Set A , Br , and Bws at 0° .

Set Ds at 500 mils.

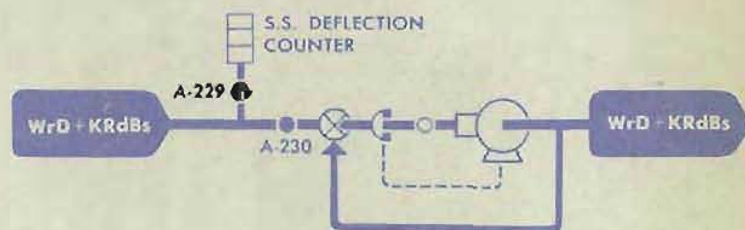
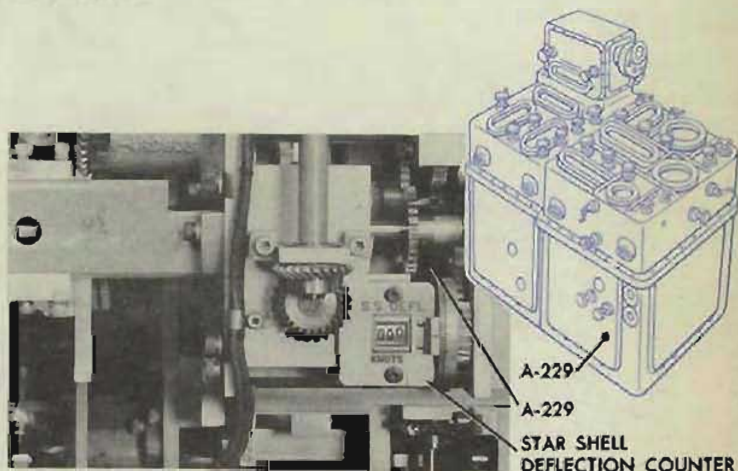
The star shell deflection counter should read 0 knots.

Adjustment

If the counter does not read 0 knots, loosen A-229. Bring the counter to 0 by turning the small spur gear which meshes with the gear on the drum of the counter.

Tighten A-229 and recheck.

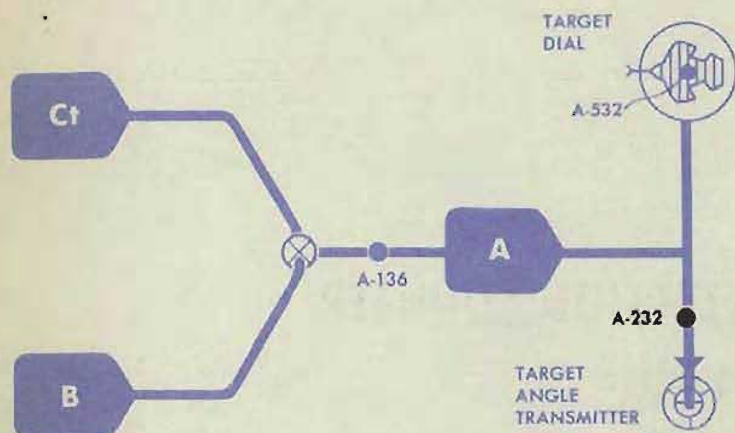
Check A-230.



A-230 and A-231

STAR SHELL COMPUTER ADJUSTMENTS

A-232 A TRANSMITTER to A DIAL



Location

A-232 is under cover 1, mounted on a worm, to the rear of the *A* transmitter.

A-232 is omitted on Mods 0, 1, 2, and 9. It is also omitted on all instruments with Ser. Nos. 421 and higher. In other instruments, Ser. Nos. 420 and lower, the *A* transmitter was altered to the *Ct* transmitter, and A-232 became an assembly clamp.

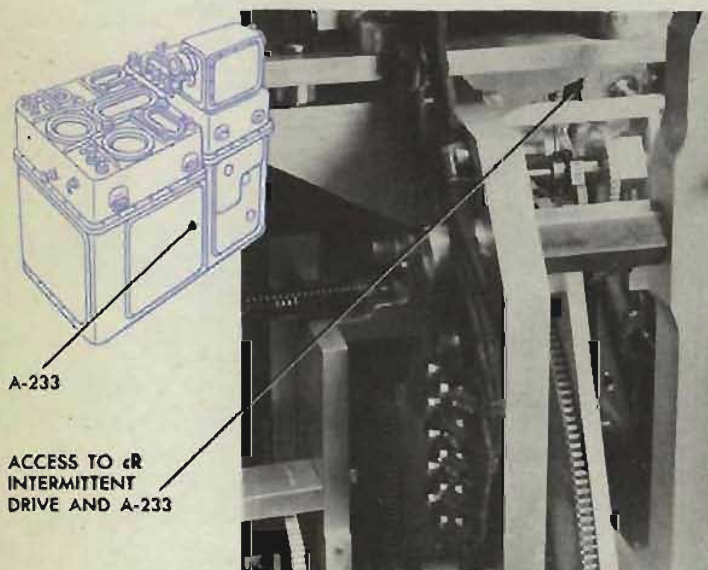
Check

A-232 should be tight. The worm on which it is mounted should be out of mesh.

Adjustment

Tighten A-232 when the worm is out of mesh.

A-233 cR INTERMITTENT DRIVE to cR DIALS



A-233

ACCESS TO cR
INTERMITTENT
DRIVE AND A-233

Location

A-233 is under cover 5, to the rear of the integrator mounting plate.

A-233 is omitted on Mods 0, 1, 2, and 9.

Check

Decrease *cR*.

Observe the output gear of the intermittent drive. It should stop turning when the *cR* dials read 750 yards. The intermittent drive is then at its lower cut-out point.

Adjustment

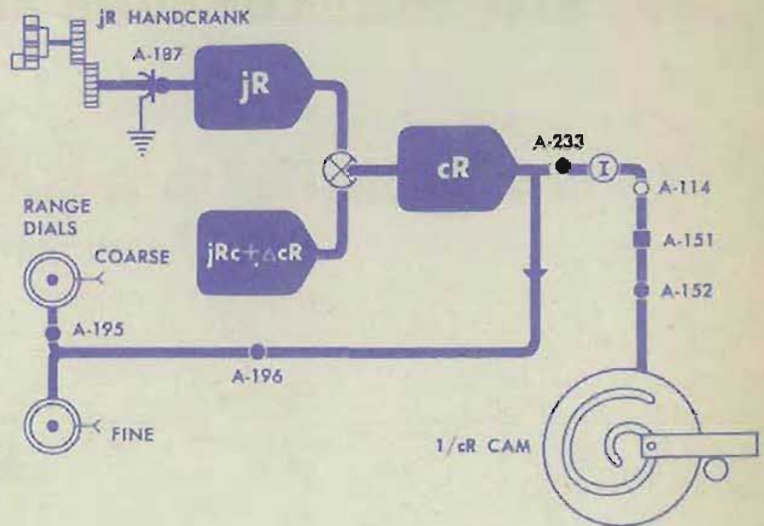
If the intermittent drive output gear does not stop turning when *cR* is decreased to 750 yards, make A-233 slip-tight.

Turn *cR* in a decreasing direction to the exact point where the intermittent drive cuts out.

Hold the large gear in the intermittent drive with a gear pusher. Bring *cR* to 750 yards with the *jR* handcrank.

Tighten A-233.

Increase *cR* until the intermittent drive output gear stops turning. This is the upper cut-out point. The *cR* dials should read 22,500 yards. Re-check at the lower cut-out point. Check A-114 and A-151.



A-234 and A-235 Rj COUNTERS to L-29

A-234 and A-235 are omitted in Mods 0, 1, 2, 5, 6, "Old" Mod 7, and Mod 9. In these mods, see A-502.

Location

A-234 and A-235 are under cover 2, below the dial mask for the *Rj* counters. They are on the ends of the *Rj* counter shafts.

A-234 is on the *Rj* OUT counter.

A-235 is on the *Rj* IN counter.

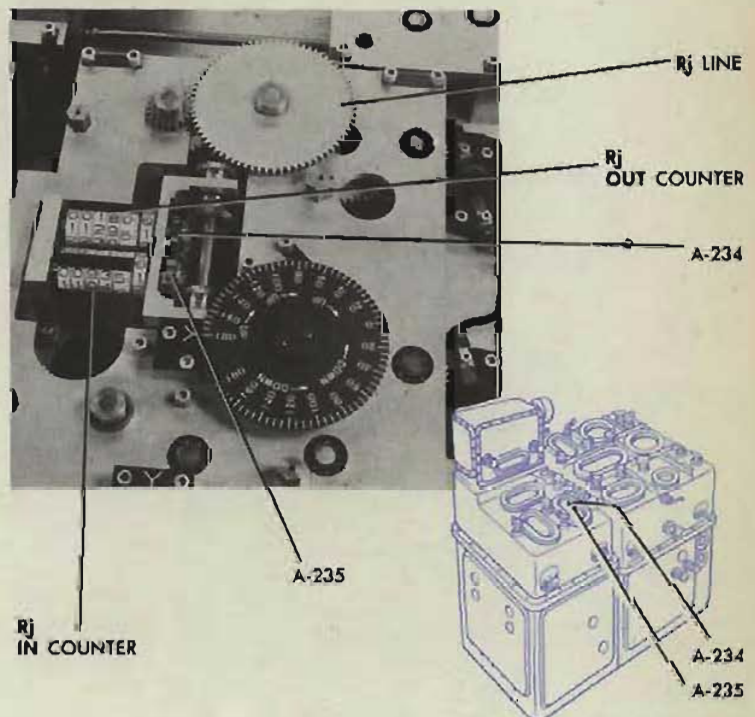
L-29 is under cover 5, in a horizontal position, with its lower limit toward the front.

Check

L-29 should reach the lower limit when the *Rj* IN counter reads 12,000 yards, and the upper limit when the *Rj* OUT counter reads 1800 yards.

A-235 Check

Run *Rj* to its IN limit. The *Rj* IN counter should read 12,000 yards.



A-235 Adjustment

If the *Rj* IN counter does not read 12,000 yards, make A-235 slip-tight. Set the counter at 12,000 yards. Tighten A-235.

A-234 Check

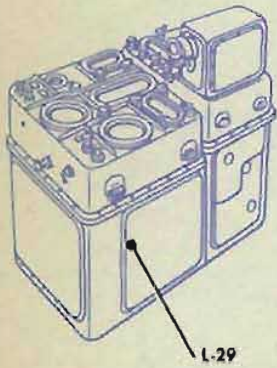
Run *Rj* to the OUT limit. The *Rj* OUT counter should read 1800 yards.

A-234 Adjustment

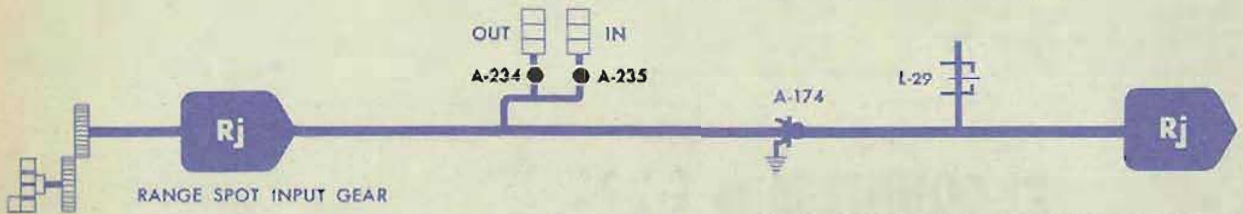
If the *Rj* OUT counter does not read 1800 yards, make A-234 slip-tight. Set the counter at 1800 yards. Tighten A-234.

Recheck

Again run L-29 to its limits. The *Rj* IN counter should read 12,000 yards at the lower limit and the *Rj* OUT counter should read 1800 yards at the upper limit. Split any overtravel and check that the counters read zero simultaneously.



L-29



A-236

Dd HOLDING FRICTION

Location

A-236 is under cover 8, above the *B'r* receiver resistor.
A-236 is not in Mod 0.

Check

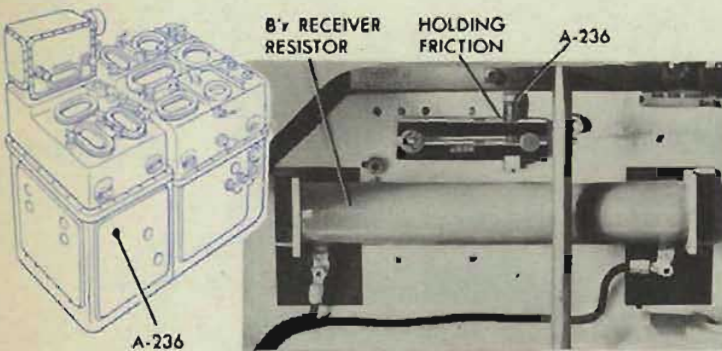
This friction should be tight enough to prevent *B'r* from backing out *Dd* when the *B'r* receiver is driving *B'gr*. It should not be so tight as to overload the *Dd* servo motor.

Adjustment

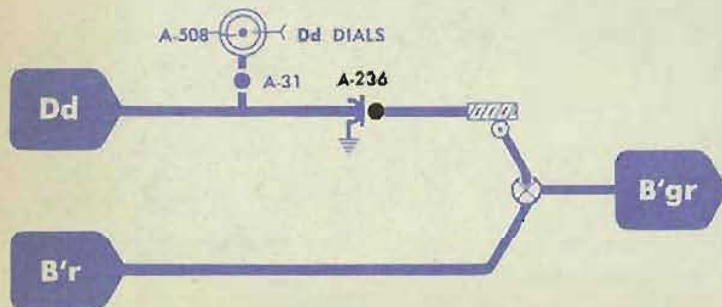
Tighten the screw all the way down; then back off two turns. Refine the adjustment by tightening or loosening the screw just enough to prevent *B'r* from backing out and yet allow the *Dd* motor to drive freely.

CAUTION

Do not tighten the screw so much that the spring is compressed solidly, as this overloads the *Dd* servo motor.



A-236



A-238 ASSEMBLY CLAMP

Location

A-238 is under cover 5, on the upper end of the magnetic drag of the bearing filter.

A-238 is omitted on Mod 0.

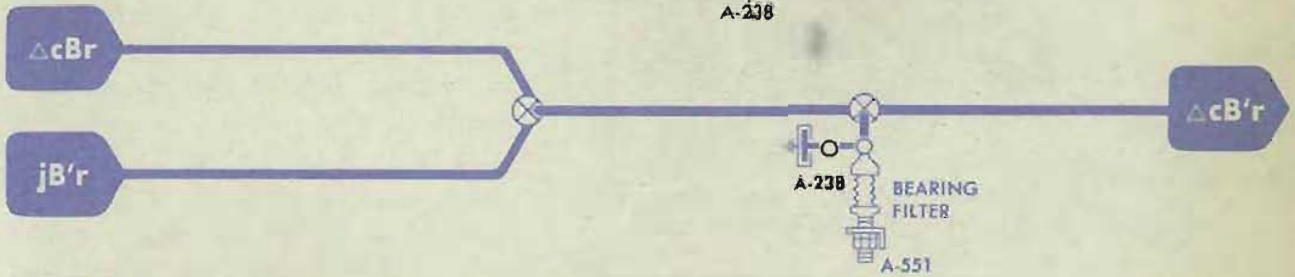
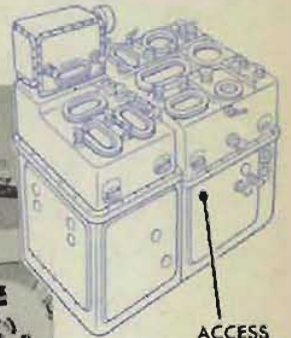
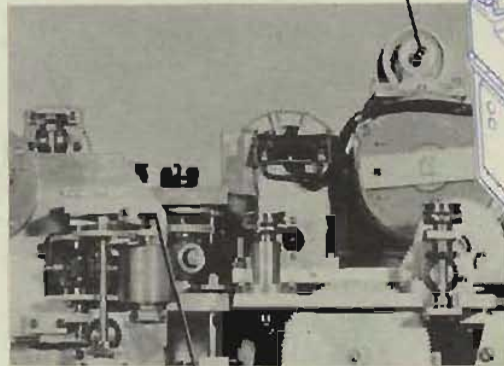
Check

A-238 should be tight, with the gear on which it is mounted in mesh with the sector gear of the bearing filter.

Adjustment

Tighten A-238.

INTEGRATOR ASSEMBLY REMOVED FROM INSTRUMENT



A-239 ASSEMBLY CLAMP

Location

A-239 is under cover 5, on the front end of the magnetic drag on the Co receiver.

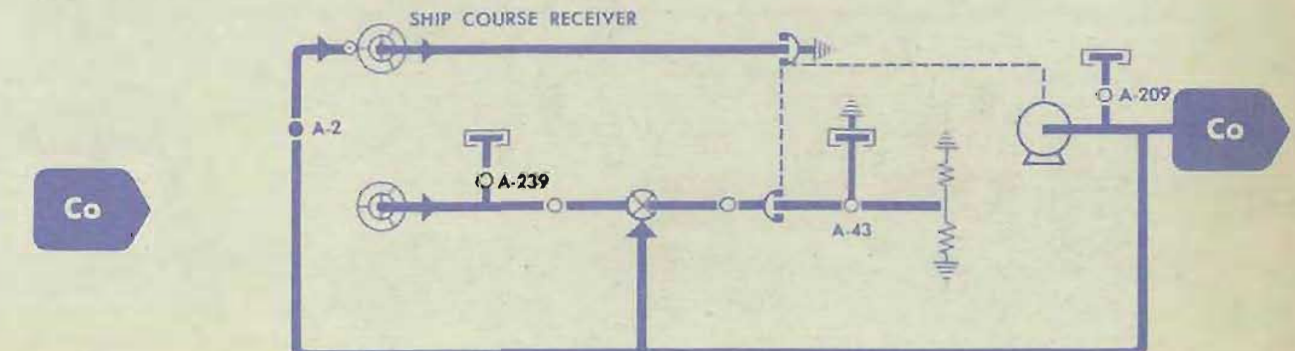
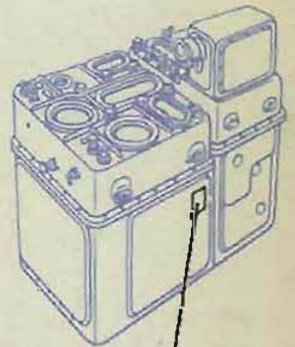
A-239 is omitted on Mod 0.

Check

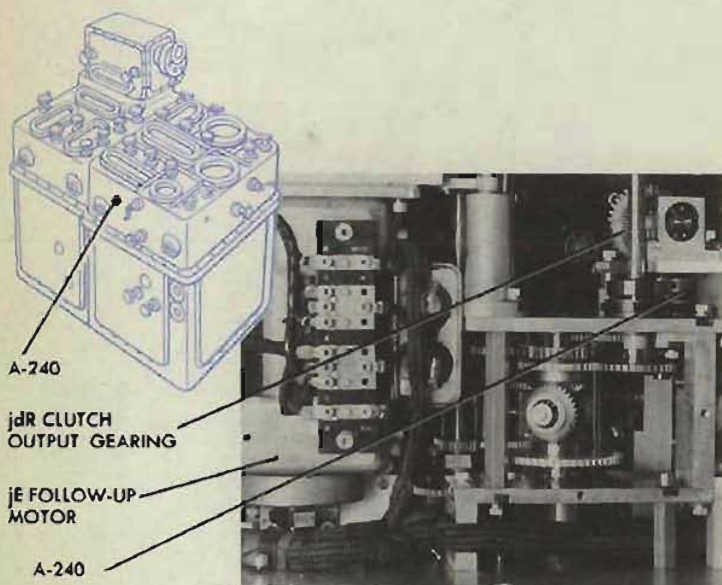
A-239 should be tight, with the gear on which it is mounted in mesh with its mating gear.

Adjustment

Tighten A-239.



A-240 *jdR* HOLDING FRICTION



Location

A-240 is under cover 1, at the rear of the elevation component integrator. A-240 is omitted on instruments with Ser. Nos. 100 and lower.

Check

This friction should be tight enough to prevent *E* or *jEc* from backing out *jdR*, but not so tight as to overload the *jdR* motor during automatic range rate control.

Turn *E* and observe the *jdR* clutch output gearing. It should remain motionless. Repeat the check, turning *jEc*.

Run the synchronizing test of the range receiver, page 62. Check that the *jdR* motor drives fast enough to synchronize within the prescribed time limit.

Adjustment

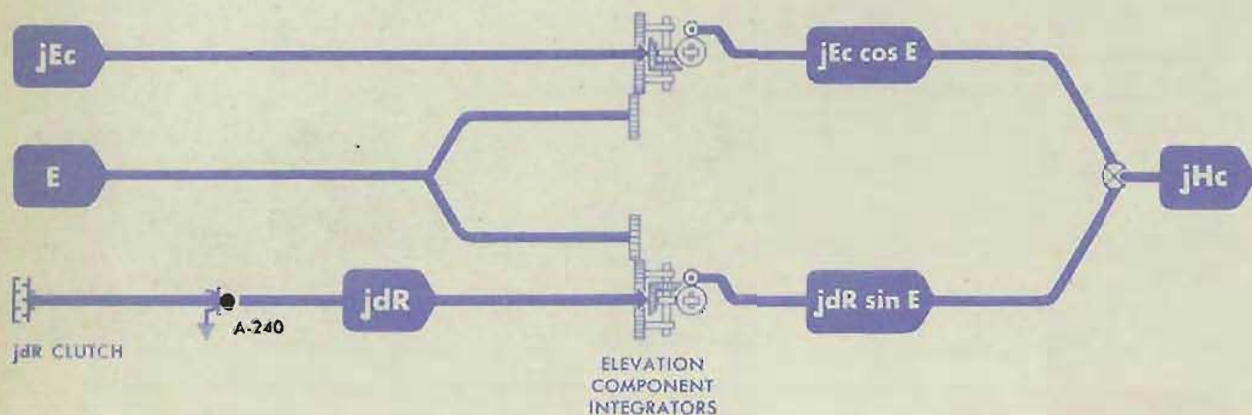
If both conditions under the check are not obtained, loosen A-240.

If the *jdR* line backs out, turn the clamp clockwise to increase the friction.

If the *jdR* motor drives too slowly, turn the clamp counterclockwise to decrease the friction.

Tighten A-240 and recheck.

Check A-164.



A-242 B'r or B'gr SLIDE GEAR to PARALLAX SECTION

Location

A-242 is located under cover 7. It consists of a flat clamp on a double slide gear. A-242 is omitted on instruments with Ser. Nos. 215 and lower.

Check

Gun train order drives the vector gear of the parallax component solver on CV's and all one-director ships. On these ships the slide gear should be pushed *up* into mesh with the *B'gr* line.

Director train drives the vector gear of the parallax component solver on BB's, CA's, CB's, CL's, and CVB's. On these ships the slide gear should be pushed *down* into mesh with the *B'r* line.

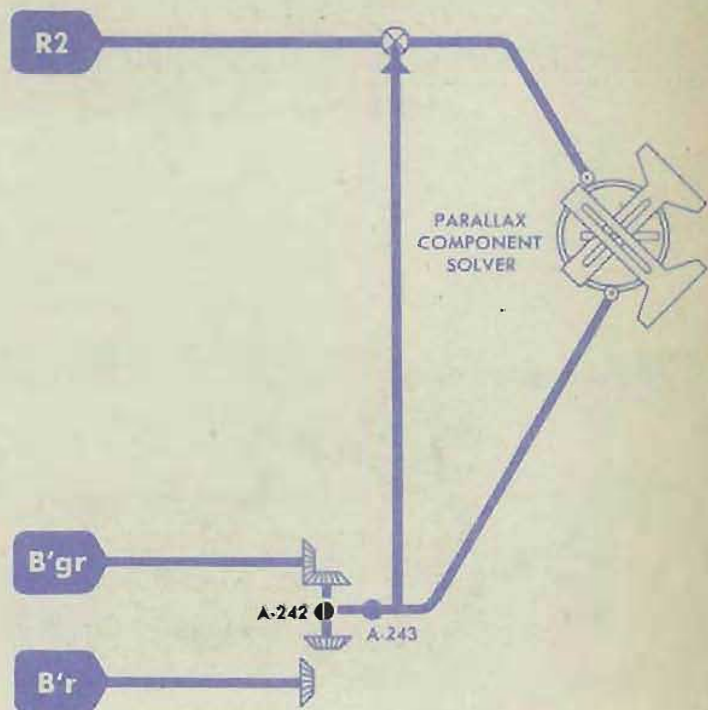
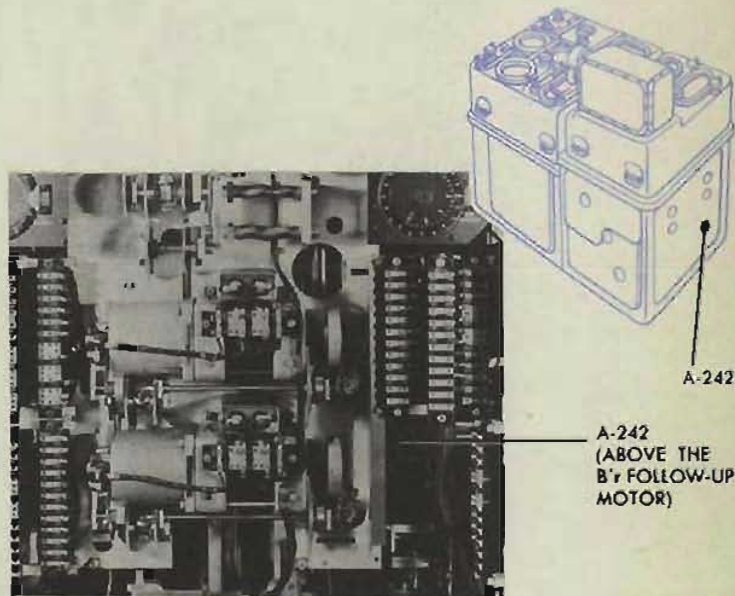
Adjustment

If the slide gear is not adjusted properly, set *B'r* equal to *B'gr*. Loosen the two screws and move the slide gear into mesh with the gear on the proper line.

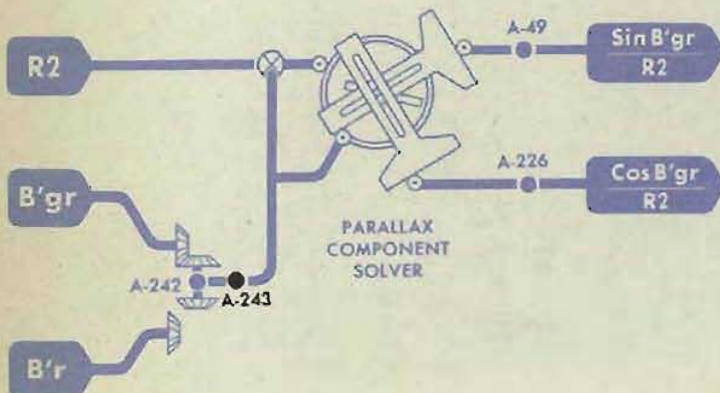
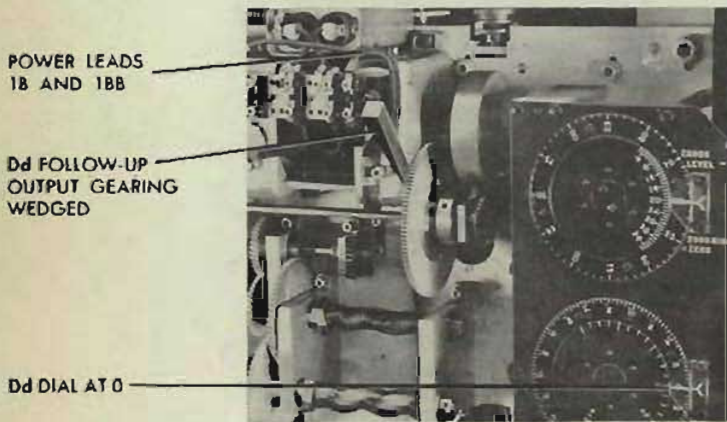
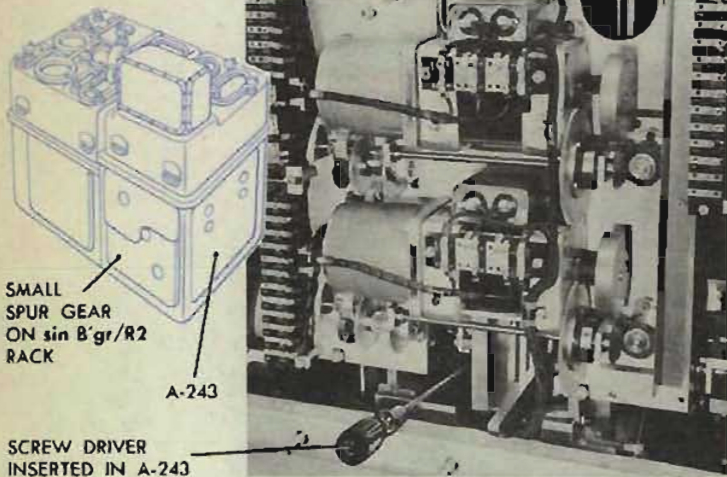
Tighten A-242.

Check to make sure that the gear mesh is not too tight and that there is no excessive lost motion.

Check A-243.



A-243 PARALLAX COMPONENT SOLVER to B'r or B'gr LINE



Location

A-243 is under cover 7, about 18 inches in from an opening below the center of the V_z follow-up. A-243 is omitted on instruments with Ser. Nos. 215 and lower. Use A-68 to make this adjustment.

Rough check

Regardless of whether the $B'gr$ or $B'r$ line is meshed to the parallax component solver, this method is used.

Set Dd at 0° . Remove leads 1B and 1BB from the Dd follow-up and wedge the output gearing.

Turn the power ON.

At the switchboard, turn off the $B'r$ receiver switch.

Set the $B'gr$ dials at 90° and wedge the line. Decrease $R2$. Use the generated range crank.

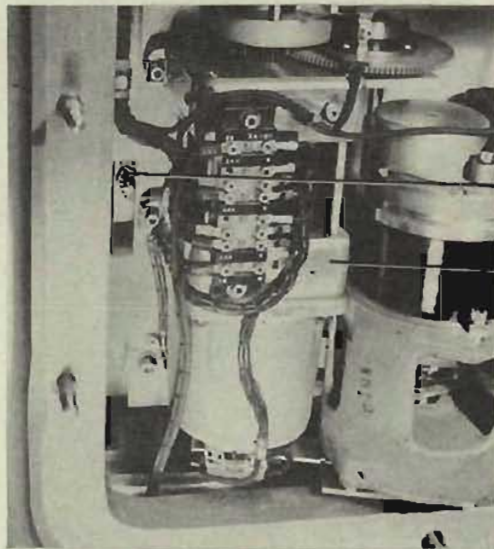
The vector gear slot of the parallax component solver should be at the position where the Ph dials turn clockwise when $R2$ is decreased. The Ph dials turn clockwise when Ph is increasing.

Fine check

Set $B'gr$ at 0° .

With $B'gr$ and Dd at 0° , changing $R2$ should not move the $(\sin B'gr)/R2$ output rack of the parallax component solver.

Set $R2$ at 18,000 yards and then decrease it to 1500 yards. Motion of the $(\sin B'gr)/R2$ rack can be observed on the small spur gear on which A-49 is mounted, under cover 6. This gear is 6 inches in, at the left side of the E_b receiver terminal block.



SMALL SPUR GEAR

E_b RECEIVER

Adjustment

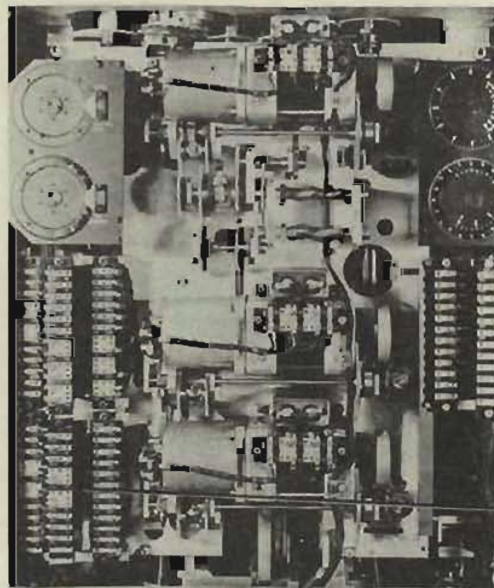
If there is any movement of the $(\sin B'gr)/R2$ rack during the fine check, make A-243 slip-tight.

Set $R2$ at 18,000 yards and mark the small spur gear next to A-49. Decrease $R2$ to 1500 yards.

Turn the $B'gr$ line to return the spur gear to the original mark.

Then hold the vector gear in position, and turn the $B'gr$ line to bring the $B'gr$ dials to zero, slipping at A-243.

The vector gear may be held in position by holding the large bevel gear 12 inches in from the lower right terminal block. This gear is in line with terminal 163 and the inner end of the coarse $E'g$ indicating transmitter.

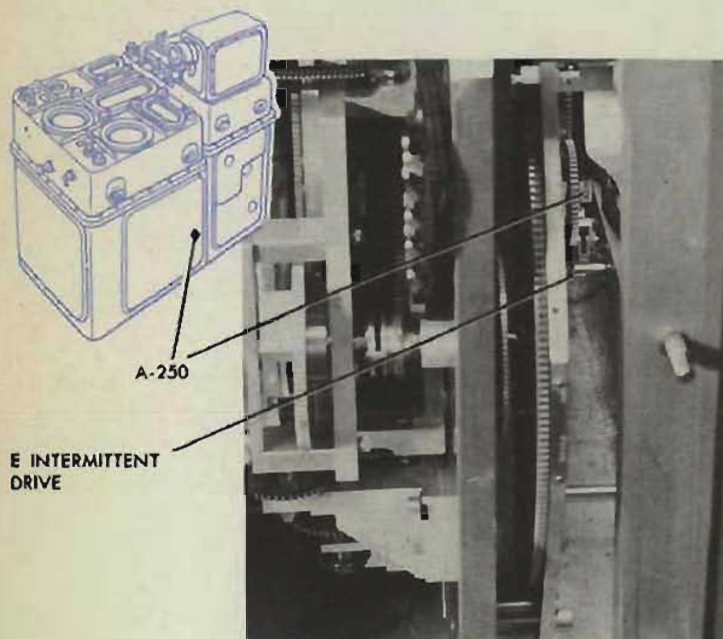


ACCESS TO LARGE BEVEL GEAR

Tighten A-243, and recheck.

Replace leads 1B and 1BB on the Dd follow-up. Check A-226 and A-49.

A-250 E INTERMITTENT DRIVE to E DIALS



Location

A-250 is under cover 5, to the rear of the large integrator mounting plate. It is on the spur gear input of the *E* intermittent drive.

A-250 is on instruments with Ser. Nos. 390 and higher, only.

Check

Decrease *E*. The output gear of the intermittent drive should stop turning when the *E* dials read -2° . The intermittent drive is then at its lower cut-out point.

CAUTION

If *E* cannot be decreased to -2° , A-146 or A-147 is upset and the end of travel has been reached on the sec *E* cam or the sec *E* integrator. If any restriction can be felt, loosen A-146.

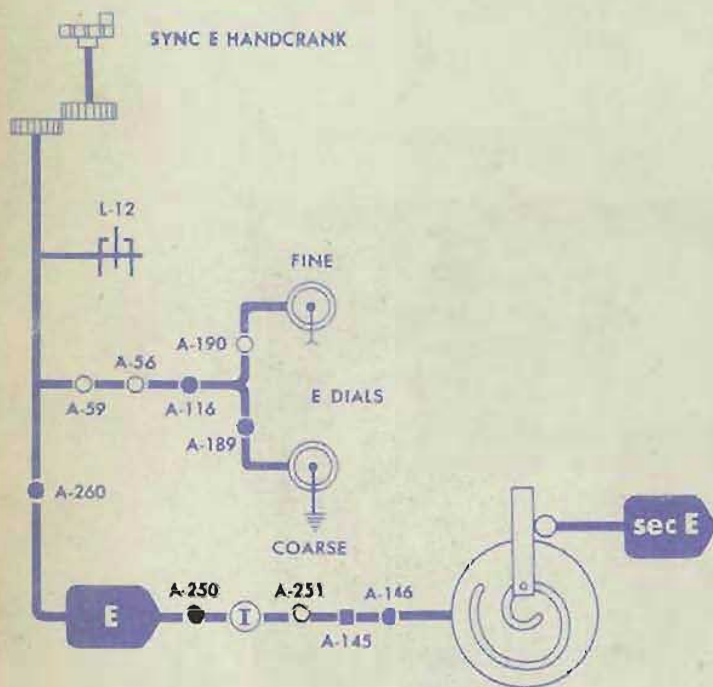
Adjustment

If the intermittent drive output gear does not stop turning at -2° , make A-250 slip-tight.

Turn *E* in a decreasing direction until the point is reached where the intermittent drive output gear just stops turning. Use a gear pusher to hold the large gear in the intermittent drive. Bring the *E* dials to -2° with the sync *E* handcrank.

Tighten A-250 and recheck. Increase *E* until the output gear stops turning. The *E* dials should read $+85^\circ$. This is the upper cut-out point of the intermittent drive. Check A-251.

Readjust A-146, A-145, and A-147.



A-251 ASSEMBLY CLAMP

See A-114.

A-254 ASSEMBLY CLAMP (Mods 8 and 12)

Location

A-254 is under cover 7, on the input to the R2 intermittent drive, behind the E'g indicating transmitters.

Check

Check A-92.

Check A-156 (Mods 8 and 12).

If the intermittent drive cuts out at the wrong point, but A-92 is correctly adjusted, A-254 is in error.

Adjustment

Readjust A-254 in accordance with the procedure for adjusting A-156 on Mods 8 and 12.

Check A-255 and A-256.

A-255 ASSEMBLY CLAMP (Mods 8 and 12)

See A-114.

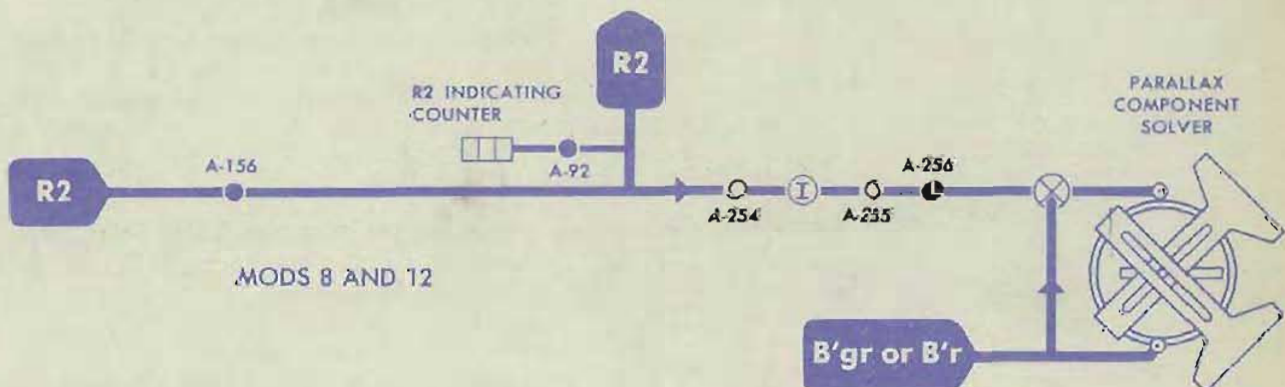
A-256 PARALLAX COMPONENT SOLVER to R2 COUNTER (Mods 8 and 12)

Location

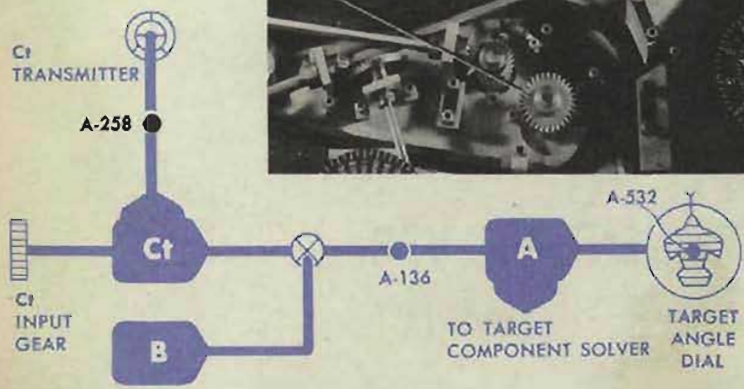
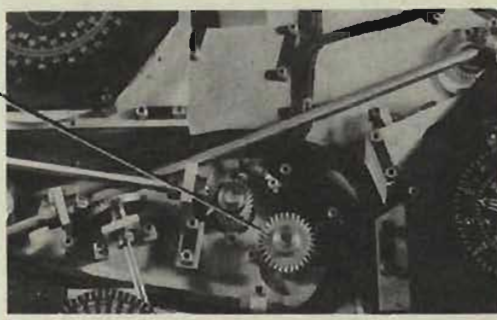
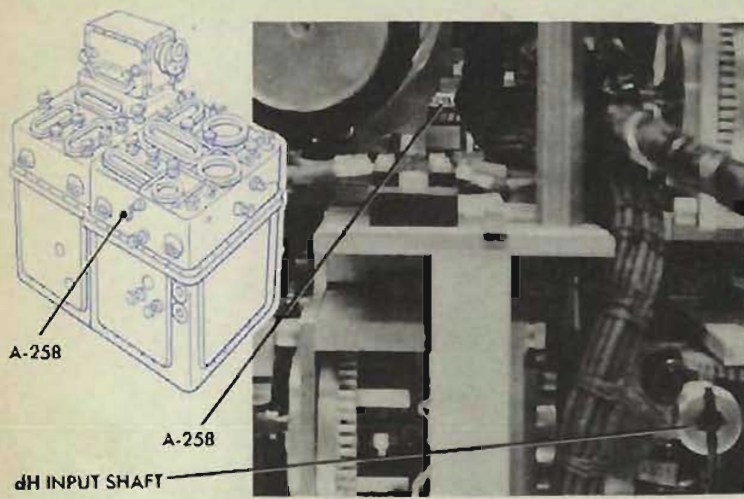
A-256 is under cover 7 on the output of the R2 intermittent drive.

Check and adjustment

Refer to the check and adjustment of A-156 on other mods.



A-258 Ct TRANSMITTER to A DIAL



Location

A-258 is under cover 1, to the front of the Ct transmitter.

Note

The Ct transmitter was formerly the A transmitter. Check that A-232 is tight and properly out of mesh on Ser. Nos. 420 and lower except on Mods 0, 1, 2, and 9, where it is omitted. A-258 is also omitted on Mods 0, 1, 2, and 9.

Check

Connect a standard motor (test synchro) to the Ct transmitter terminals. Set B at 180°. Set A at 0°.

The rotor of the Ct transmitter synchro should be on electrical zero. It is on electrical zero when the standard motor dial index matches the fixed motor index.

Adjustment

If the rotor of the synchro is not on electrical zero, make A-258 slip-tight. Use the Ct input gear to turn the rotor until the synchro is on electrical zero. Secure the rotor by holding the worm about 2 inches above A-258.

Turn the Ct input gear to bring A back to 0°.

Tighten A-258, and recheck. Disconnect the standard motor from the Ct transmitter.

A-259 E COUNTER IN CORRECTOR UNIT to E DIALS

Location

A-259 is centrally located, where the corrector and computer units join, accessible from cover 8.

Check

The reading on the E counter in the corrector unit should agree with the reading on the E dials.

NOTE: The E counter is installed only in computers with Ser. Nos. 435 and higher.

Adjustment

If the counter reading does not agree with the dial reading, slip-tighten A-259. Set the counter to read the same value as the E dials.

Tighten A-259.

Check A-260.

A-260 E COUNTER IN COMPUTER UNIT to E DIALS

Location

A-260 is located where the computer and corrector units join, a few inches away from A-259. It is accessible from cover 5.

Check

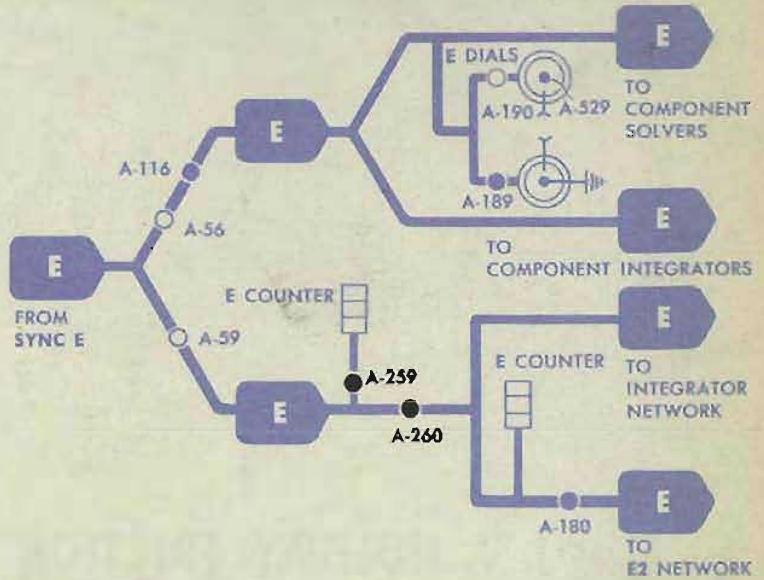
The reading on the *E* counter in the computer unit should agree with the reading on the *E* dials.

NOTE: The *E* counter is installed only in computers with Ser. Nos. 435 and higher.

Adjustment

If the *E* counter reading does not agree with the *E* dial reading, slip-tighten A-260. Set the *E* counter to read the same value as the dials. Tighten A-260 and recheck.

NOTE: A-260 and A-259 are usually adjusted at the same time.



A-261 ASSEMBLY CLAMP

Location

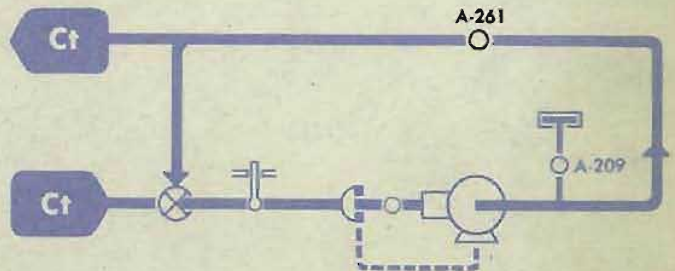
A-261 is under cover 1, in the *Ct* follow-up control gearing.

Check

A-261 should be tight.

Adjustment

Tighten A-261.



A-262 Tg + F - Tf LINE to L-14

Location

A-262 is under cover 3, above the *I.V.* dial, on Ser. Nos. 781 and higher.

Check

Turn the power OFF.

On Mod 13:

Set *Tg* at 0 sec.; set *F* at 51 sec.; turn *Tf*.

L-14 should act when *Tf* reads 1 and 51 sec.

On Mods 8 and 12:

Set *Tg* at 5 sec.; set *F* at 48 sec.; decrease *Tf*.

Upper limit of L-14 should act when *Tf* reads 3 sec.

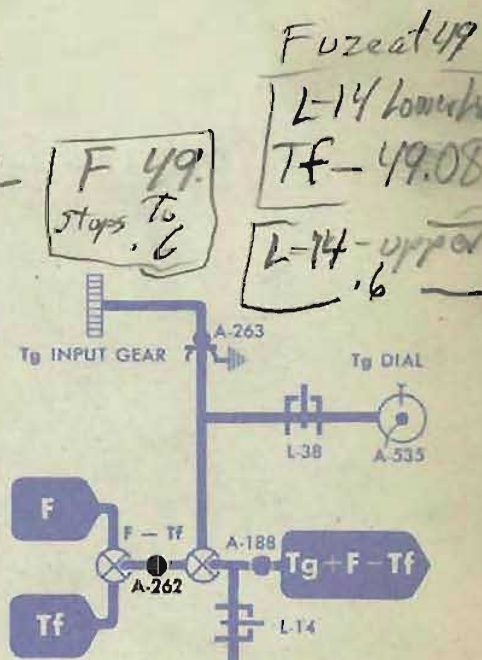
Set *F* at 45 sec.; increase *Tf*.

Lower limit of L-14 should act when *Tf* reads 50 sec.

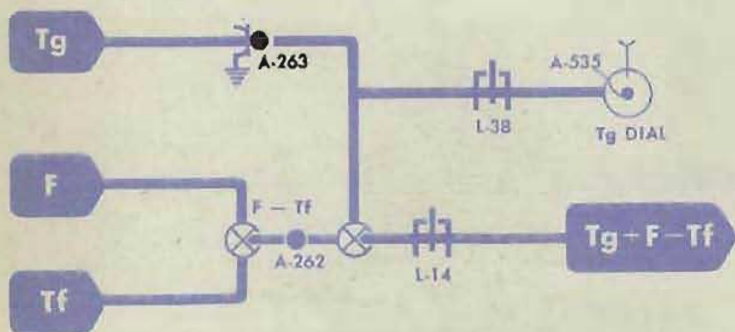
Adjustment

If the limits of L-14 are incorrect, loosen A-262. Hold the *Tg* + *F* - *Tf* line against the limit. Turn the *Tf* line until the counter reads the correct value. Tighten A-262, and check the other limit.

Check A-188.



A-263 Tg HOLDING FRICTION



Location

A-263 is under cover 3, behind the *Tg* input gear on Ser. Nos. 781 and higher.

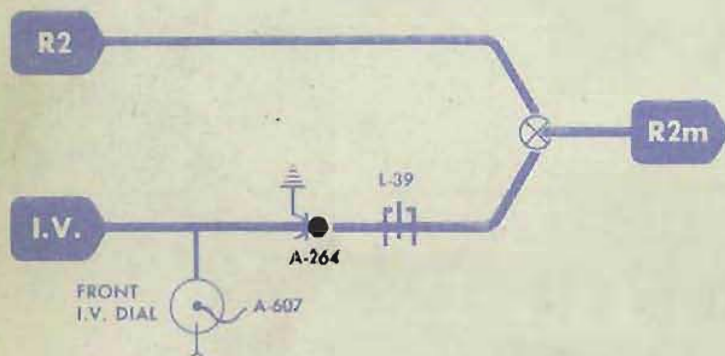
Check

The *Tg* friction load should be heavy enough to hold the *Tg* dial on its setting during operation of the computer.

Adjustment

Loosen the screw in A-263. Turn the clamp clockwise to increase the friction. Tighten the screw.

A-264 I.V. HOLDING FRICTION



Location

A-264 is under cover 4, in the *Ti/R2* ballistic computer gearing, to the right of the *I.V.* dial, on Ser. Nos. 811 and higher.

Check

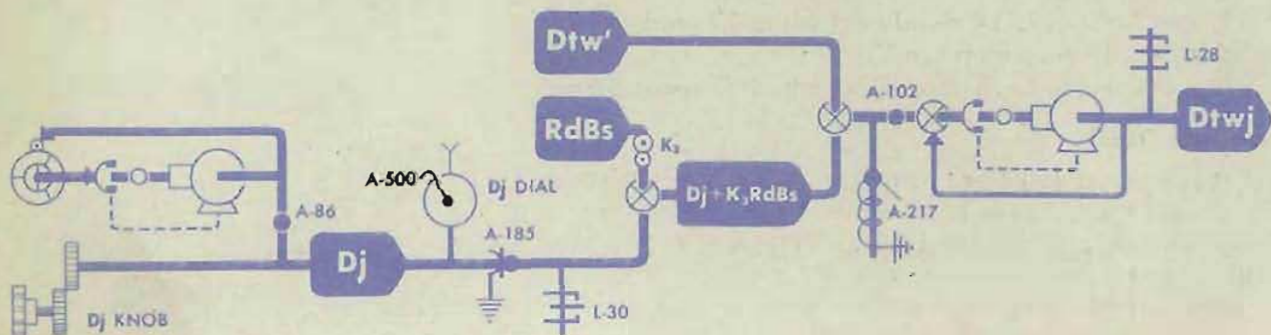
The friction should be tight enough to hold the *I.V.* setting.

Adjustment

Loosen the screw in A-264. Turn the clamp clockwise to increase the friction.

Tighten the screw.

A-500 Dj DIAL to L-30



Location

A-500 is under cover 2, on the *Dj* dial.

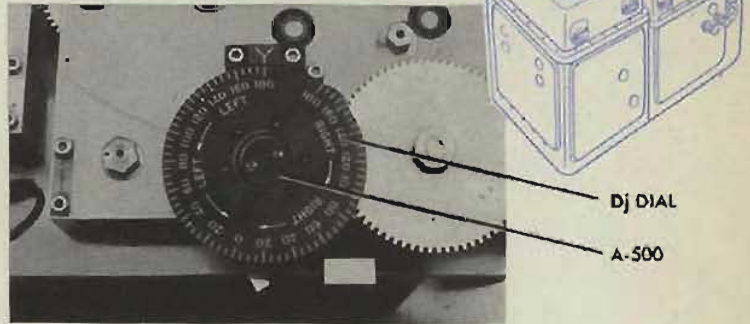
Check

Decrease *Dj* until the lower limit of L-30 is reached. The *Dj* dial should read LEFT 180 mils.

Adjustment

If the *Dj* dial does not read LEFT 180, loosen A-500. Hold the line against the stop, and slip the dial to the correct reading. Tighten A-500 and check at the upper limit. The *Dj* dial should read RIGHT 180.

Readjust A-86. Check A-102.



A-501 Vj DIAL to L-31

Location

A-501 is under cover 2 on the *Vj* dial.

Check

Turn the power OFF.

Turn the *Vj* input gear to increase *Vj* until the upper limit of L-31 is reached.

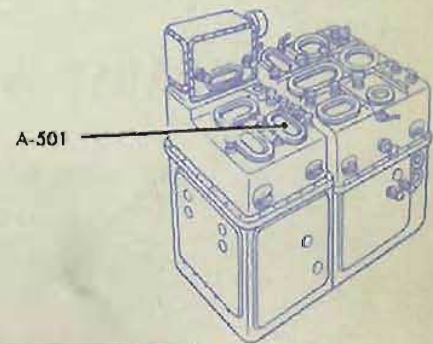
The dial should read UP 180 mils.

On Mods 8 and 12, the upper limit is 342.5 mils (24,600 yards on the overlaid transparent dial).

Adjustment

If the *Vj* dial does not read the proper value, loosen A-501. Hold the *Vj* line against the stop, and slip the dial to the correct reading.

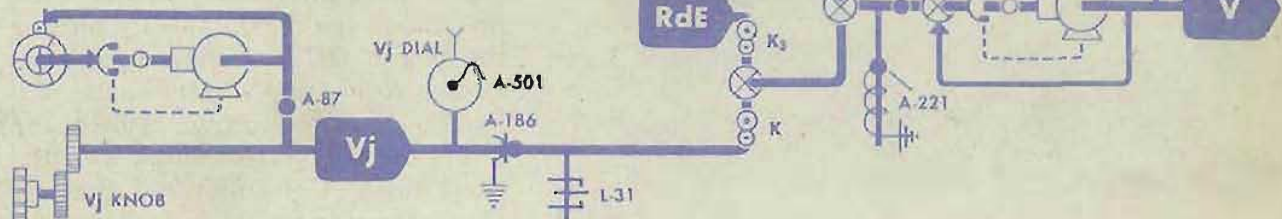
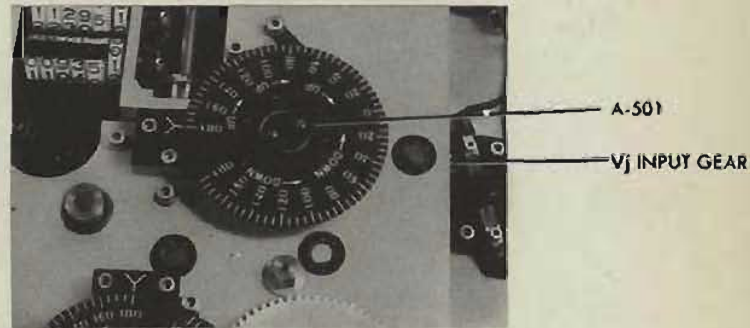
Tighten A-501.



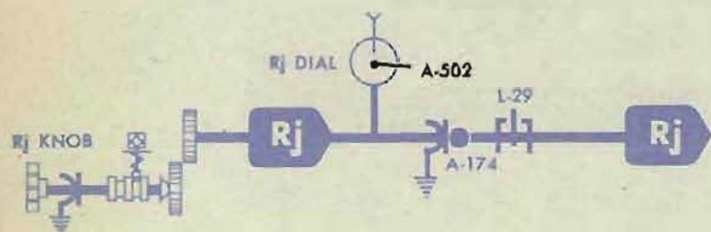
Recheck

Run the *Vj* line to the lower limit. The *Vj* dial should read DOWN 180 mils.

Readjust A-87. Check A-103.



A-502 Rj DIAL to L-29



Location

A-502 is under cover 2 on the *Rj* dial, on Mods 0, 1, 2, 5, 6, "Old" 7, and 9, only.

Check

Turn *Rj* to the upper limit of L-29. The *Rj* dial should read 1800 yards OUT.

Turn *Rj* to the lower limit. The *Rj* dial should read 1800 yards IN.

Adjustment

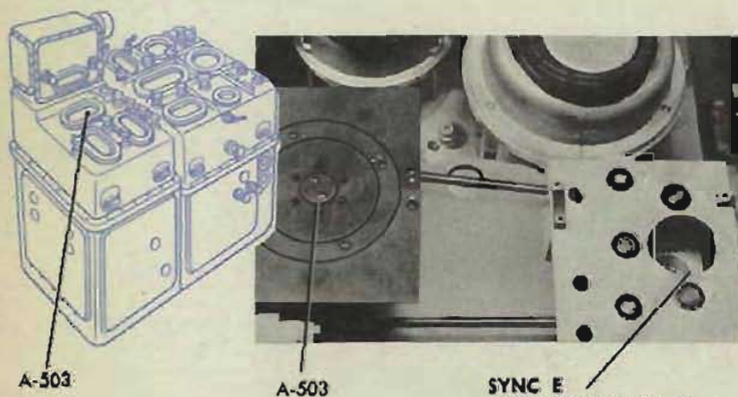
Loosen A-502.

Hold the *Rj* line against the limit stop. Slip the dial to the proper reading.

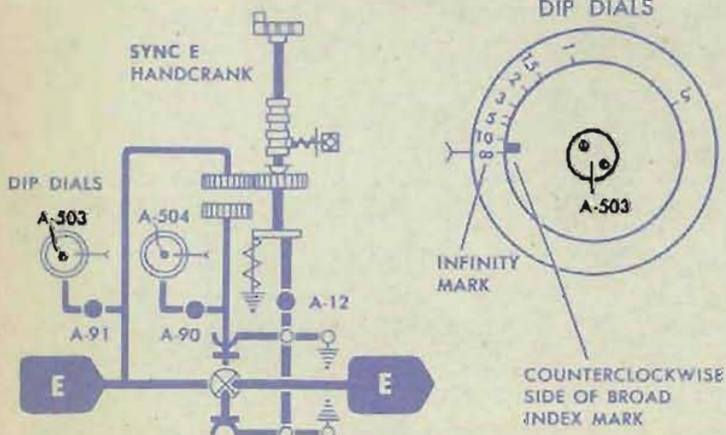
Tighten A-502, and check at the other limit.

Check A-104 and A-88.

A-503 COARSE to FINE DIP DIAL



SYNC E
OUT-POSITION GEAR
(UNDER PLATE)



Location

A-503 is under cover 2, on the coarse dip dial.

Check

Set the counterclockwise side of the broad index mark on the coarse dial against the fixed index. The infinity mark of the fine dial should also be at the fixed index.

Set the clockwise side of the broad index on the coarse dial against the fixed index. The ring dial should read 0.5.

Adjustment

If the dials do not agree at the fixed index, bring the infinity mark on the fine dial to the fixed index by turning the sync *E* OUT-position input gear. Loosen A-503 and slip the coarse dial until the counterclockwise side of the broad index mark is in line with the fixed index. Tighten A-503, and re-check. Readjust A-91.

A-504 COARSE to FINE SYNC E DIAL

Location

A-504 is under cover 2, on the hub of the coarse sync E dial.

Check

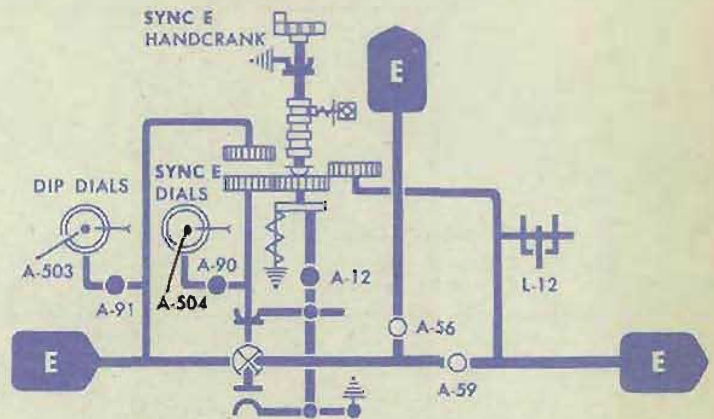
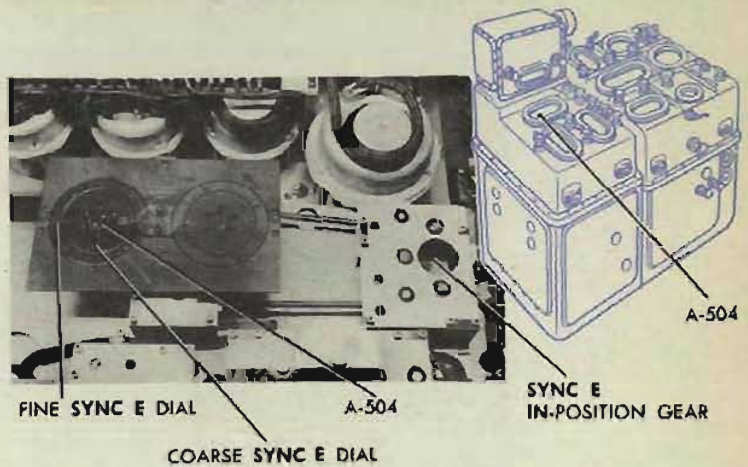
Set the index on the coarse dial at the fixed index. The index on the fine dial should also be at the fixed index.

Adjustment

If both dials cannot be set at the fixed index, bring the index on the fine dial to the fixed index by turning the sync E IN-position input gear.

Loosen A-504 and slip the coarse dial until the coarse index matches the fixed index and the fine dial graduation.

Tighten A-504, and recheck. Check A-90.



A-505 COARSE to FINE L DIAL

Location

A-505 is under cover 7, on the coarse L dial.

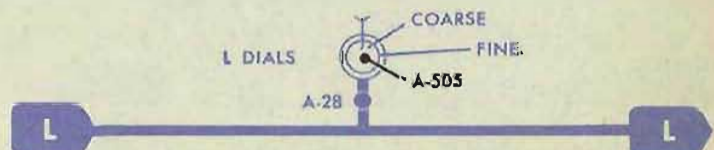
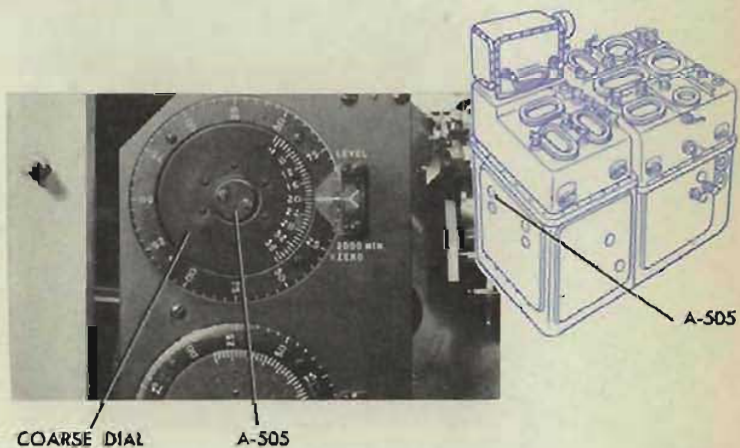
Check

Turn the L line at the stable element to set the computer L dials at 2000'. When the coarse dial reads 20, the fine dial should read 00.

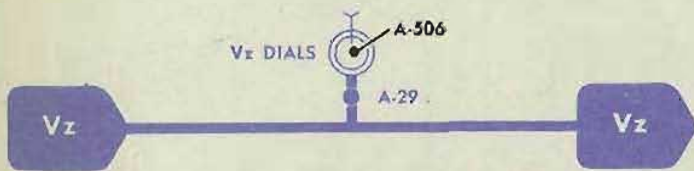
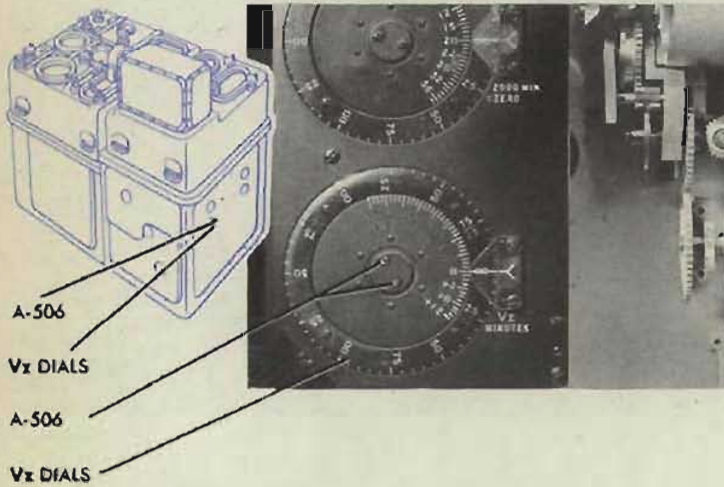
Adjustment

If the coarse dial does not read 20 when 00 on the fine dial matches the index, loosen A-505 and slip the coarse dial to 20.

Tighten A-505 and recheck. Check A-28.



A-506 COARSE to FINE Vz DIAL



Location

A-506 is under cover 7, on the coarse Vz dial.

Check

Turn the power OFF.

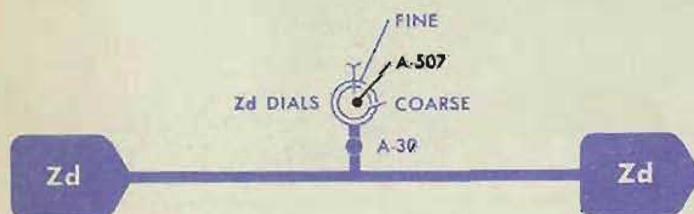
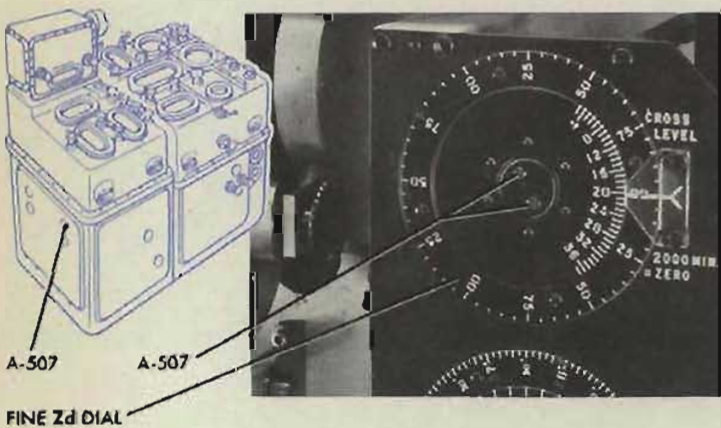
Set the 0 graduation on the coarse Vz dial at the fixed index by turning the output gearing on the Vz follow-up. The 00 graduation on the ring dial should be in line with the 0 graduation on the coarse dial and the fixed index.

Adjustment

If the dial readings do not agree, bring the 00 reading on the fine Vz dial to the fixed index. Loosen A-506 and slip the 0 mark on the coarse Vz dial to the fixed index.

Tighten A-506, and recheck. Check A-29.

A-507 COARSE to FINE Zd DIAL



Location

A-507 is under cover 7, on the coarse Zd dial.

Check

Set the computer Zd dials at 2000' by turning the Zd shaft line. When the fine dial is at 00, the coarse dial should read 20.

Adjustment

If the coarse Zd dial does not read 20, loosen A-507, and slip the coarse dial to 20.

Tighten A-507, and recheck. Check A-30.

A-508 COARSE to FINE Dd DIAL

Location

A-508 is under cover 7, on the coarse *Dd* dial.

Check

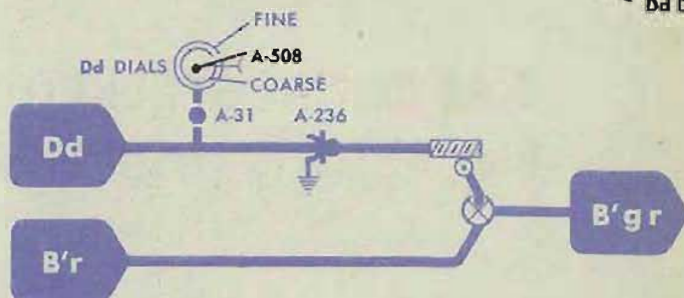
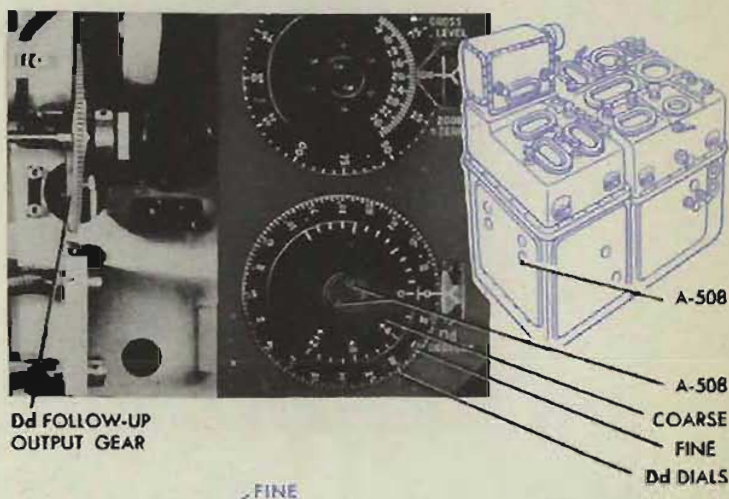
Turn the power OFF.

Set the *Dd* dials at 0 by turning the *Dd* follow-up output gearing.

Adjustment

If the coarse *Dd* dial does not read 0, when the fine dial reads 0 at the fixed index, loosen A-508 and slip the coarse dial to 0.

Tighten A-508, and recheck.
Check A-31.



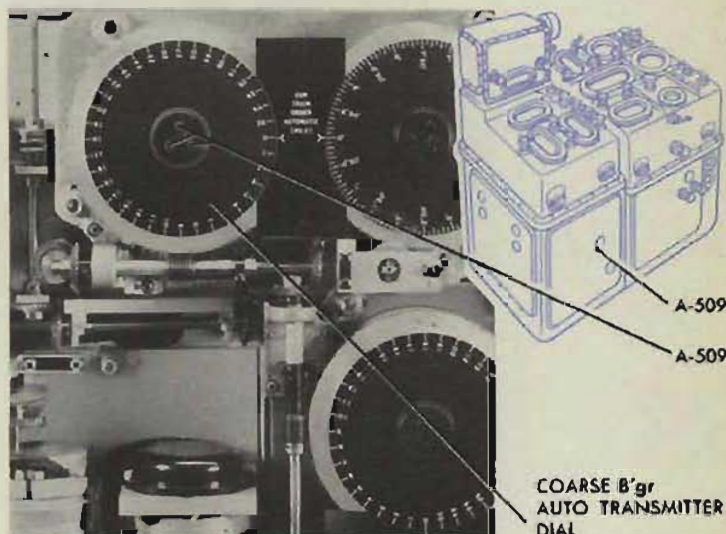
A-509 DIAL to COARSE SYNCHRO — B'gr AUTO TRANSMITTER

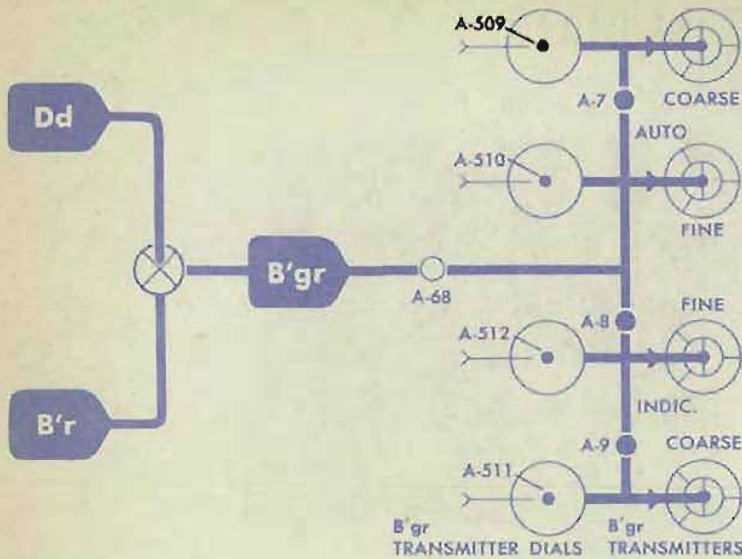
Location

A-509 is under cover 8, on the coarse *B'gr* automatic transmitter dial.

Check

Set the coarse *B'gr* automatic transmitter dial at 0°. The coarse *B'gr* automatic transmitter synchro should be on electrical zero.





Adjustment

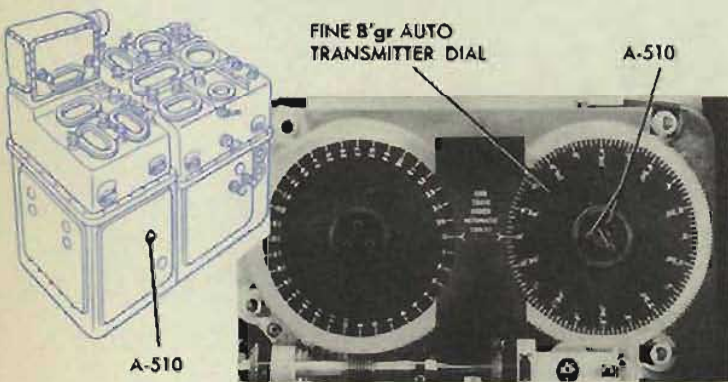
Set the coarse synchro of the transmitter on electrical zero.

Loosen A-509 and slip the dial to 0.

Tighten A-509, and recheck.

Check A-7.

A-510 DIAL to FINE SYNCHRO — B'gr AUTO TRANSMITTER

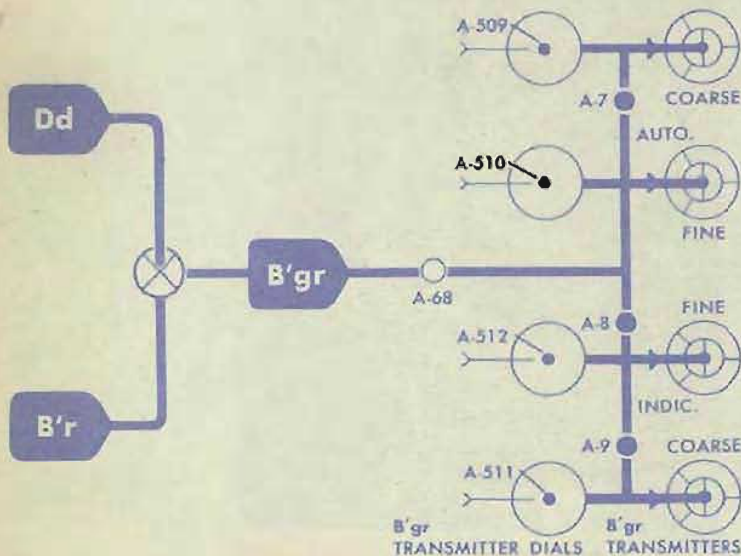


Location

A-510 is under cover 8, on the fine B'gr automatic transmitter dial.

Check

Set the fine B'gr automatic transmitter dial at 0°. The fine B'gr automatic transmitter synchro should be on electrical zero.



Adjustment

Set the fine synchro of the B'gr automatic transmitter on electrical zero.

Loosen A-510, and slip the dial to 0°.

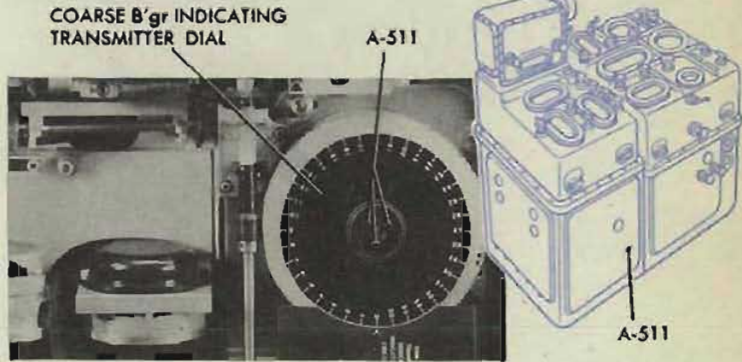
Tighten A-510, and recheck.

Check A-7.

A-511 DIAL to COARSE SYNCHRO — B'gr INDICATING TRANSMITTER

Location

A-511 is under cover 8, on the coarse B'gr indicating transmitter dial.



Check

Set the coarse B'gr indicating transmitter dial at 0°. The coarse B'gr indicating transmitter synchro should be on electrical zero.

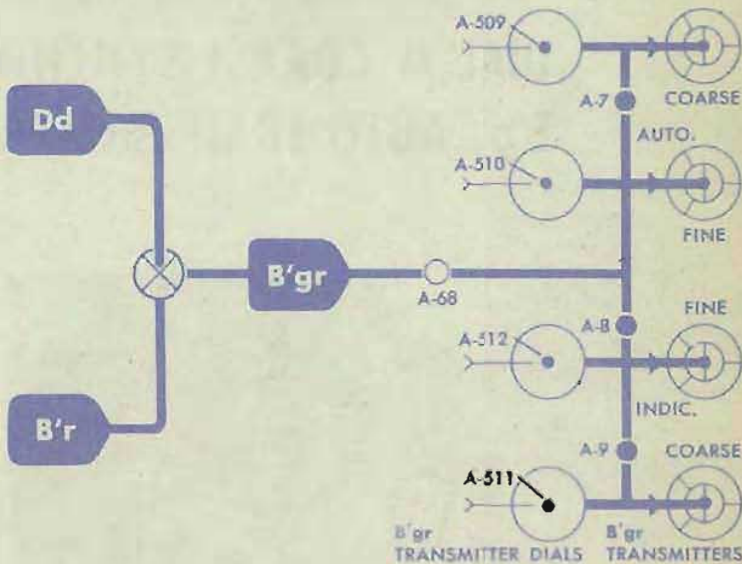
Adjustment

Set the coarse synchro of the B'gr indicating transmitter on electrical zero.

Loosen A-511, and slip the dial to 0°.

Tighten A-511, and recheck.

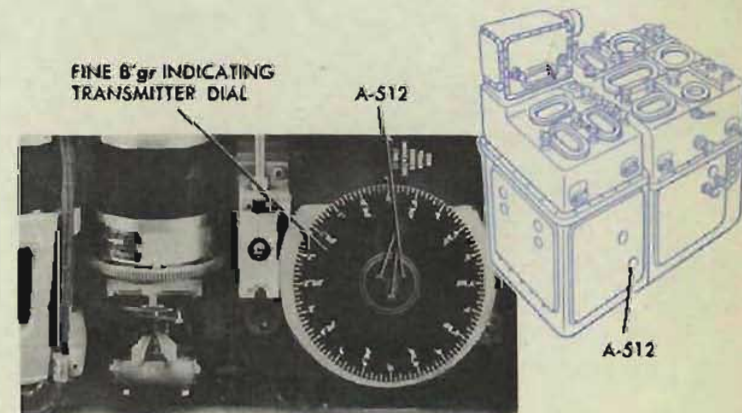
Check A-9.



A-512 DIAL to FINE SYNCHRO — B'gr INDICATING TRANSMITTER

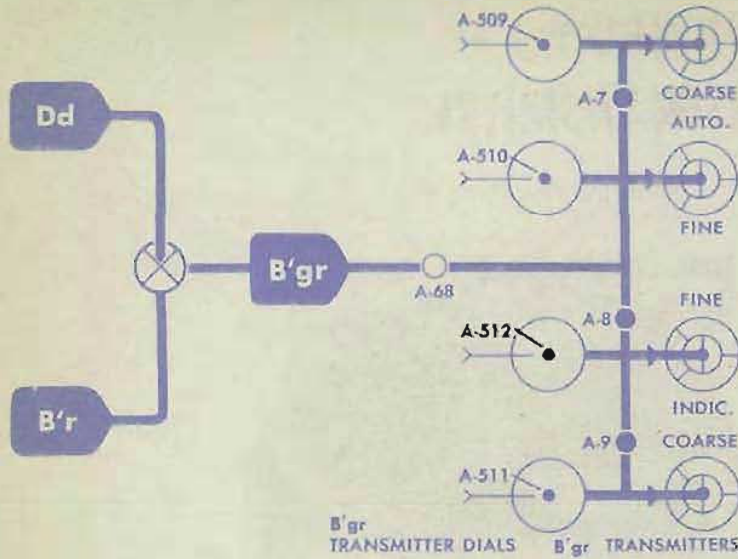
Location

A-512 is under cover 8, on the fine B'gr indicating transmitter dial.



Check

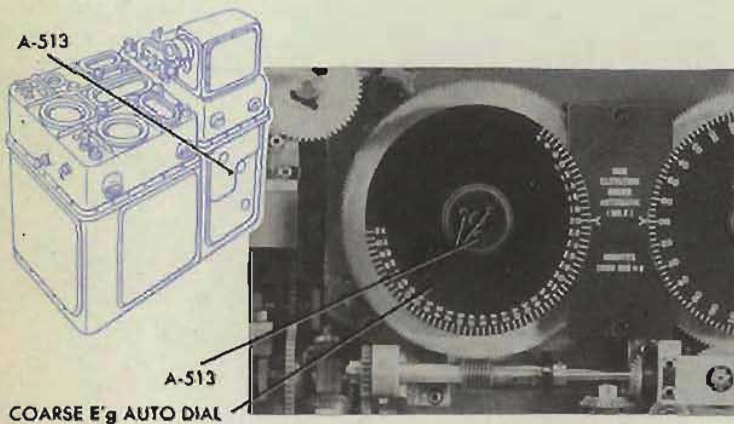
Set the fine B'gr indicating transmitter dial at 0°. The fine B'gr indicating transmitter synchro should be on electrical zero.



Adjustment

Set the fine synchro of the *B'gr* indicating transmitter on electrical zero. Loosen A-512, and slip the dial to 0°. Tighten A-512, and recheck. Check A-9.

A-513 DIAL to COARSE SYNCHRO — E'g AUTO TRANSMITTER

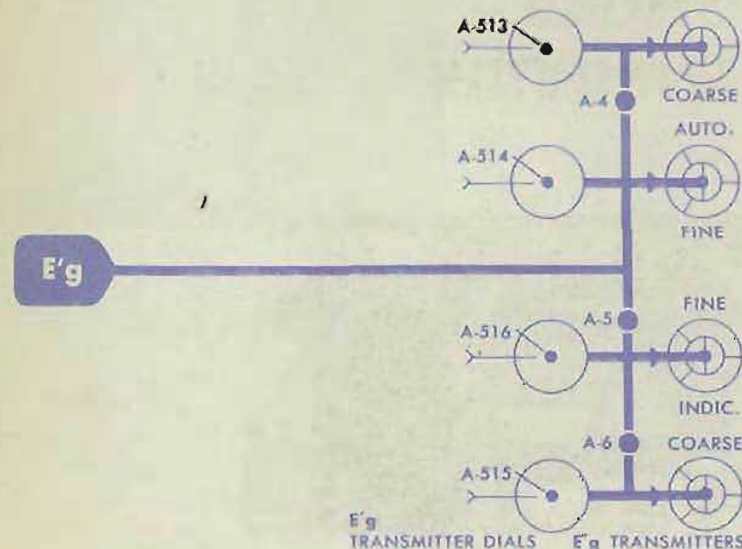


Location

A-513 is under cover 6, on the coarse *E'g* auto transmitter dial.

Check

Set the coarse synchro of the *E'g* auto transmitter on electrical zero. The coarse dial should read 20.



Adjustment

If the coarse *E'g* dial does not read 20 when the coarse synchro is at electrical zero, loosen A-513 and slip the dial to the correct reading. Tighten A-513, and recheck. Check A-4.

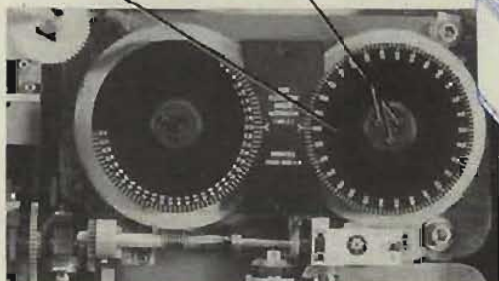
A-514 DIAL to FINE SYNCHRO — E'g AUTO TRANSMITTER

Location

A-514 is under cover 6, on the fine E'g automatic transmitter dial.

FINE E'g AUTO DIAL

A-514



A-514

Check

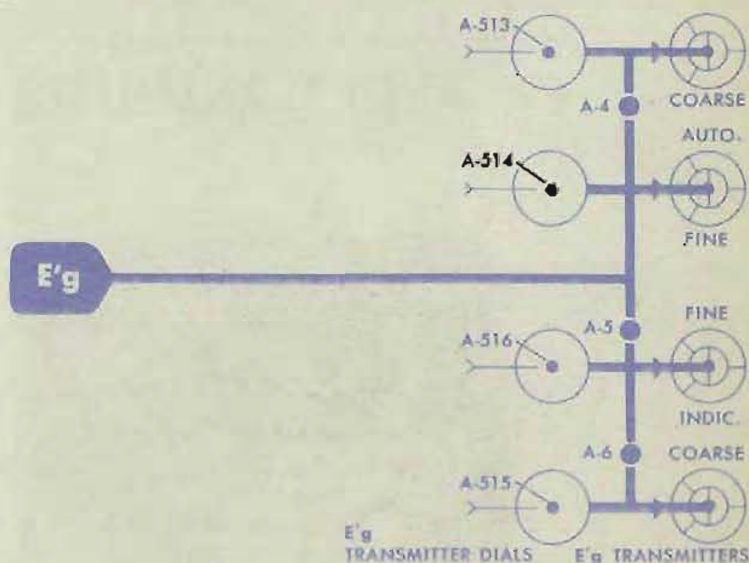
Set the fine synchro of the E'g automatic transmitter on electrical zero. The fine dial should read 00.

Adjustment

If the fine E'g auto dial does not read 00, loosen A-514 and slip the dial to 00.

Tighten A-514, and recheck.

Check A-4.



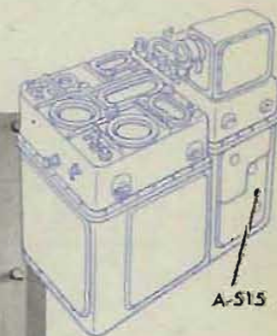
A-515 DIAL to COARSE SYNCHRO — E'g INDICATING TRANSMITTER

Location

A-515 is under cover 6, on the coarse E'g indicating transmitter dial.

COARSE E'g INDICATING DIAL

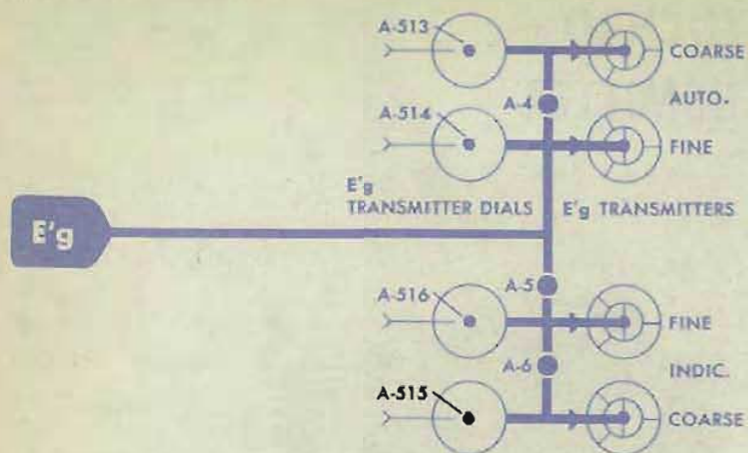
A-515



A-515

Check

Set the coarse synchro of the E'g indicating transmitter on electrical zero. The coarse E'g indicating dial should read 20.



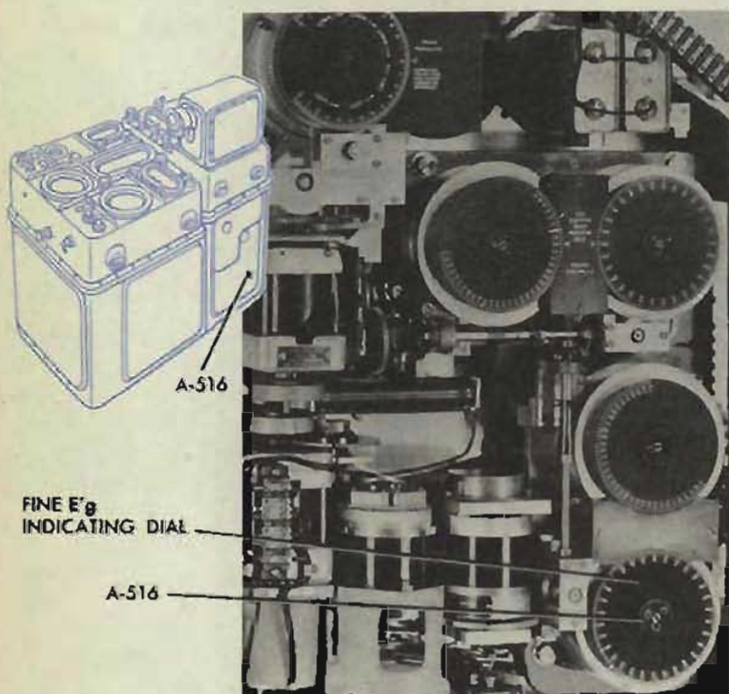
Adjustment

Set the coarse synchro of the transmitter at electrical zero. If the coarse *E'g* indicating dial does not read 20, loosen A-515 and slip the *E'g* dial to 20.

Tighten A-515, and recheck.

Check A-6.

A-516 DIAL to FINE SYNCHRO — E'g INDICATING TRANSMITTER

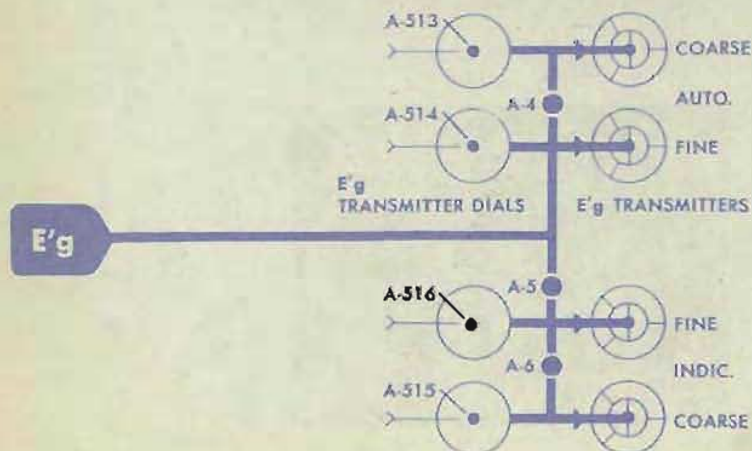


Location

A-516 is under cover 6, on the fine *E'g* indicating transmitter dial.

Check

Set the fine synchro of the transmitter on electrical zero. The fine *E'g* indicating dial should read 00.



Adjustment

Set the fine synchro on electrical zero. If the fine indicating *E'g* dial does not read 00, loosen A-516 and slip the dial to 00.

Tighten A-516, and recheck.

Check A-6.

A-517 DIAL to SYNCHRO — Ph TRANSMITTER

Location

A-517 is under cover 6, on the *Ph* transmitter dial.

Check

Loosen A-52.

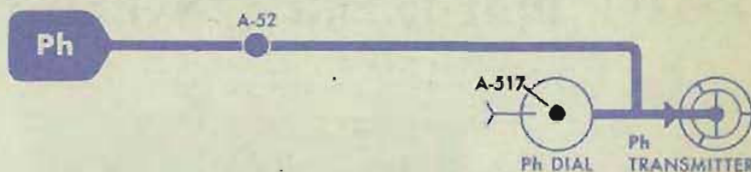
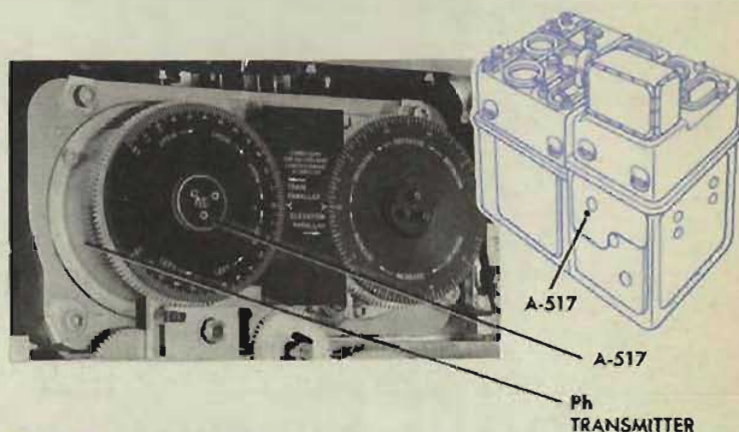
Set the synchro of the *Ph* transmitter on electrical zero. The *Ph* dial should read 0° .

Adjustment

If the *Ph* dial does not read 0° , loosen A-517 and slip the *Ph* dial to its proper value.

Tighten A-517, and recheck.

Readjust A-52.



A-520 DIAL to COARSE SYNCHRO — R RECEIVER

Location

A-520 is under cover 1, on the coarse synchro of the *R* receiver.

Check

Transmit 10,000 yards range from the director. Check that there is torque on the synchro rotor by trying to turn the inner dial.

Turn the range rate control switch to **MANUAL**.

Set the coarse ring dial at 10,000 yards.

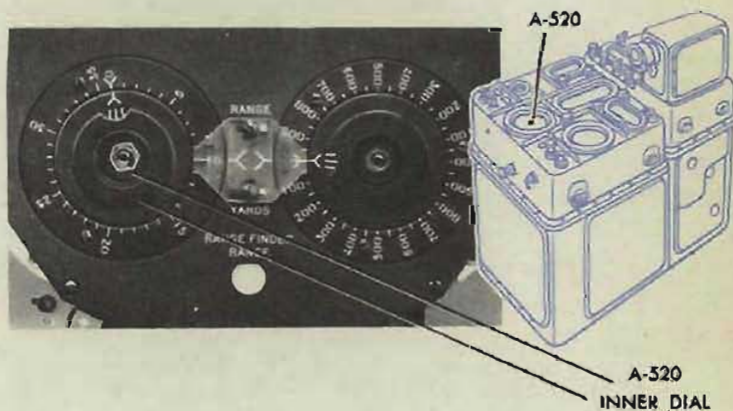
The index on the inner dial should match the 0 index on the ring dial.

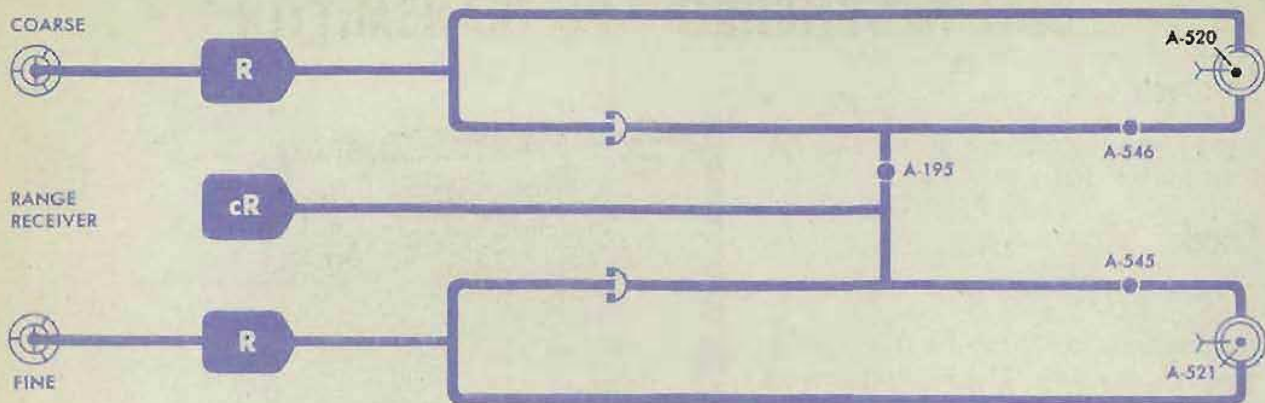
Adjustment

If the index on the inner dial does not match the index on the ring dial, loosen A-520 with a synchro dial wrench. Move the inner dial until it matches.

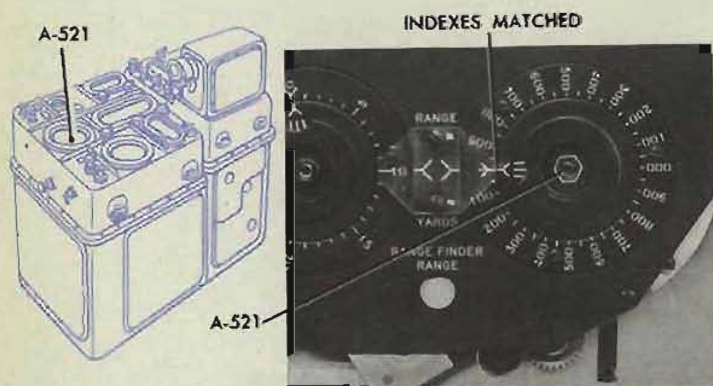
Tighten A-520, and recheck.

Check A-521, A-546, and A-195.





A-521 DIAL to FINE SYNCHRO — R RECEIVER



Location

A-521 is under cover 1, on the fine synchro of the R receiver.

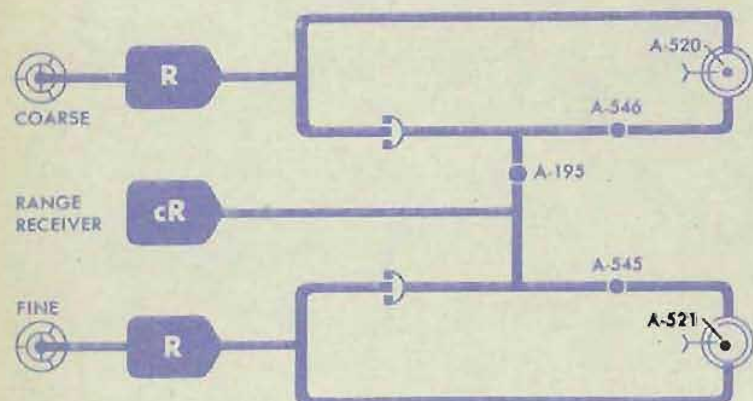
Check

Transmit 10,000 yards range from the director.

Turn the range rate control switch to **MANUAL**.

Set the fine range ring dial index at the fixed index.

The index on the fine inner dial should match the index on the ring dial.



Adjustment

If the indexes do not match, loosen A-521 with a synchro dial wrench. Move the inner dial until the indexes match.

Tighten A-521, and recheck.

Check A-545.

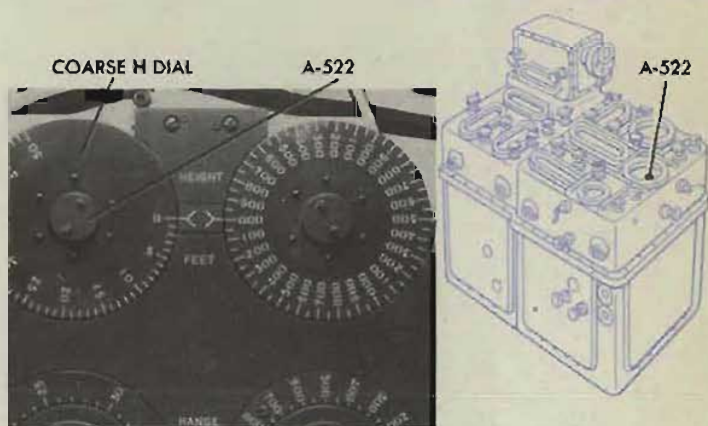
A-522 COARSE H DIAL to HEIGHT COMPUTER

Location

A-522 is under cover 1, on the coarse *H* dial.

Check

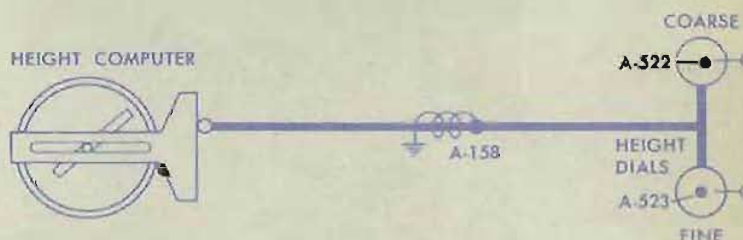
Set *E* at 0°.
Set *cR* at 0 yards.
The coarse *H* dial should read 0 feet.



Adjustment

If the coarse *H* dial does not read 0, loosen A-522 and slip the dial to 0.

Tighten A-522, and recheck.



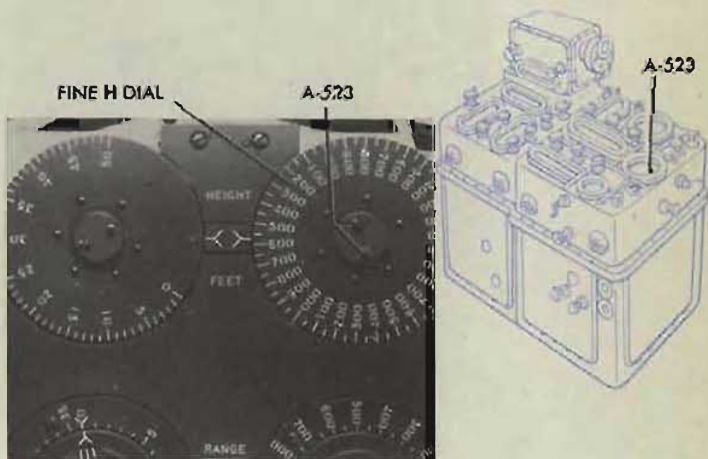
A-523 FINE H DIAL to HEIGHT COMPUTER

Location

A-523 is under cover 1, on the fine *H* dial.

Check

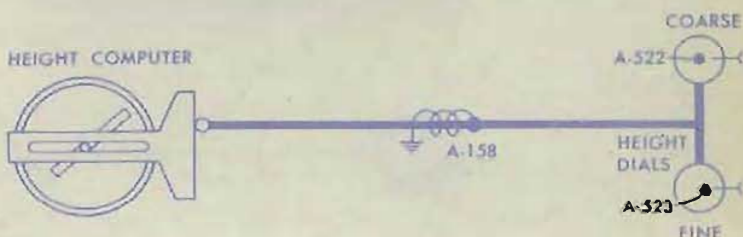
Set *cR* at 0 yards.
Set *E* at 0°.
The fine *H* dial should read 000.



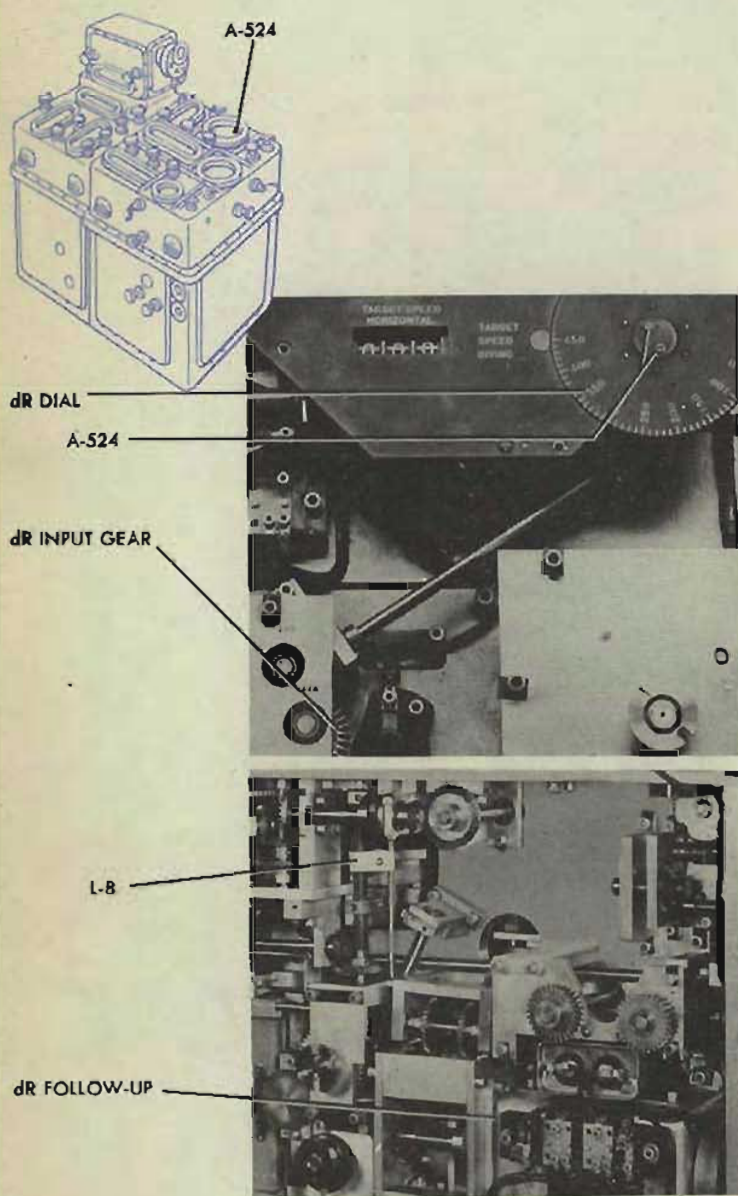
Adjustment

If the fine *H* dial does not read 000, loosen A-523 and slip the dial to 000.

Tighten A-523, and recheck.



A-524 dR DIAL to L-8



Location

A-524 is under cover 1, on the dR dial.

L-8 is under cover 1, above the gearing on the dR follow-up. It is mounted vertically, with the lower limit at the bottom.

Check

Turn the power OFF.

Turn dR until L-8 reaches the lower limit. The dR dial should read -450 on the inscribed side of the dial.

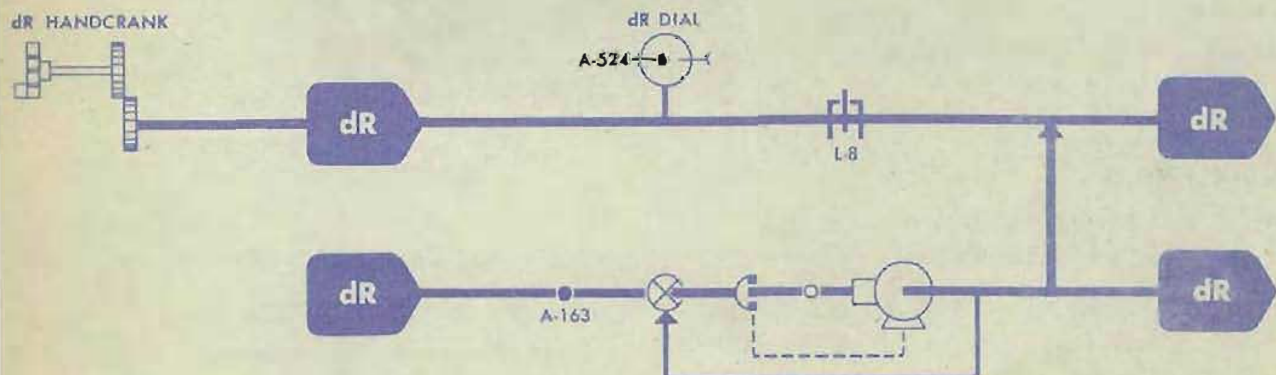
Adjustment

If the dial does not read the proper value, loosen A-524.

Hold the dR line against the stop and slip the dR dial to -450 knots.

Tighten A-524 and recheck at the upper limit. The dR dial should read +450 knots on the blank side of the dial.

Check A-163.

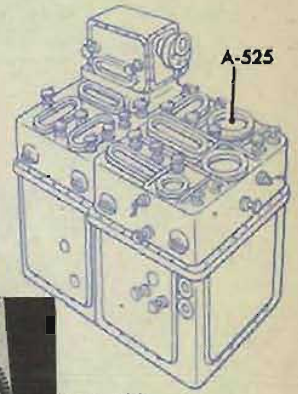


A-525 dH DIAL to L-4

Location

A-525 is under cover 1, on the *dH* dial.

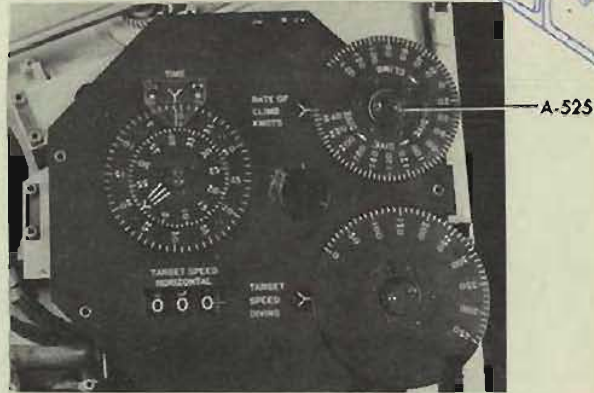
L-4 is under cover 1 on the underside of the top plate. Its lower limit is toward the left.



Check

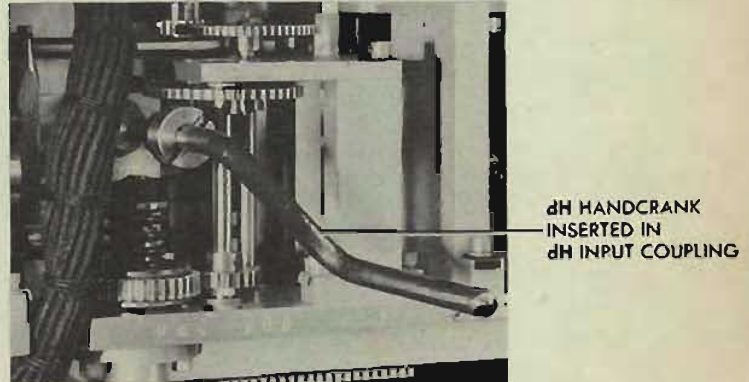
Run the *dH* line by hand to either limit.

At the upper limit, the *dH* dial should read CLIMB 150, and at the lower limit it should read DIVE 250.



Note

If either limit of L-4 cannot be reached, A-126 may be causing a restriction. If so, loosen and readjust it later.



Adjustment

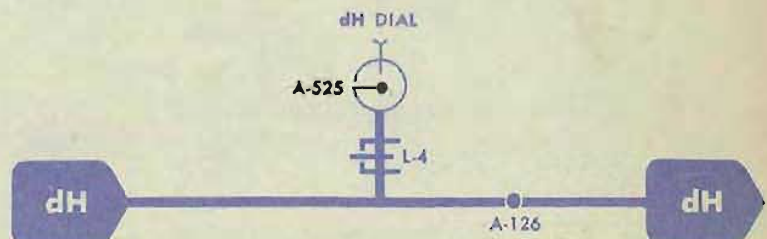
If the *dH* dial does not read the proper value at its limits, loosen A-525.

Hold the *dH* line against either limit and slip the *dH* dial to the proper value.

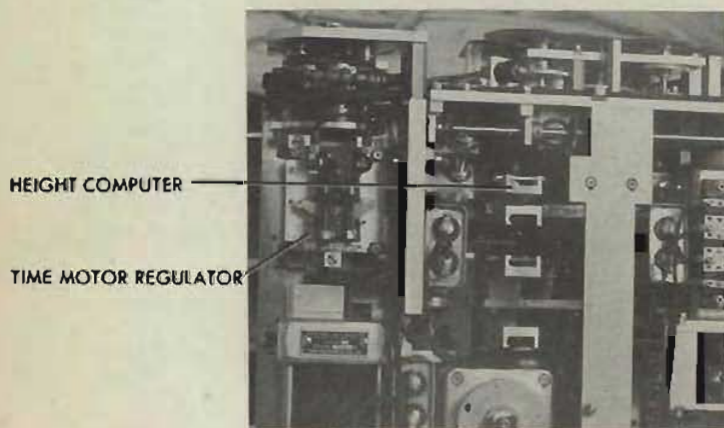
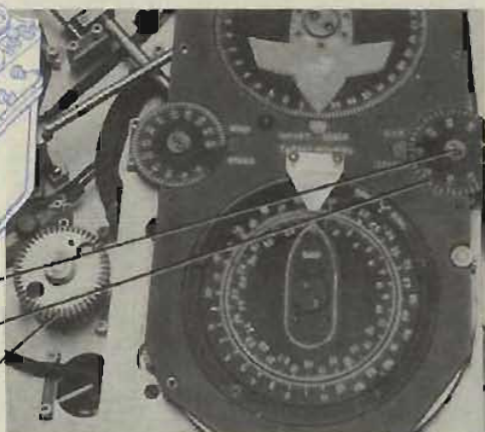
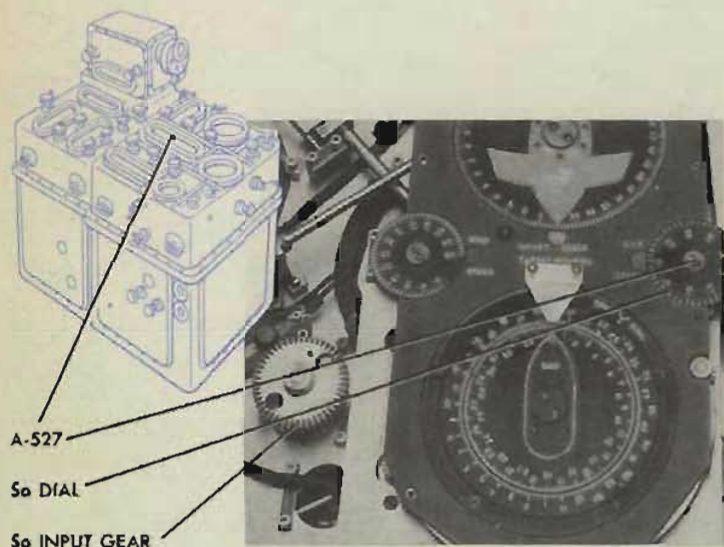
Tighten A-525, making sure that the *dH* line is held against the stop.

Recheck at the other limit of L-4.

Check A-126.



A-527 So DIAL to L-1



Location

A-527 is under cover 1, on the So dial.

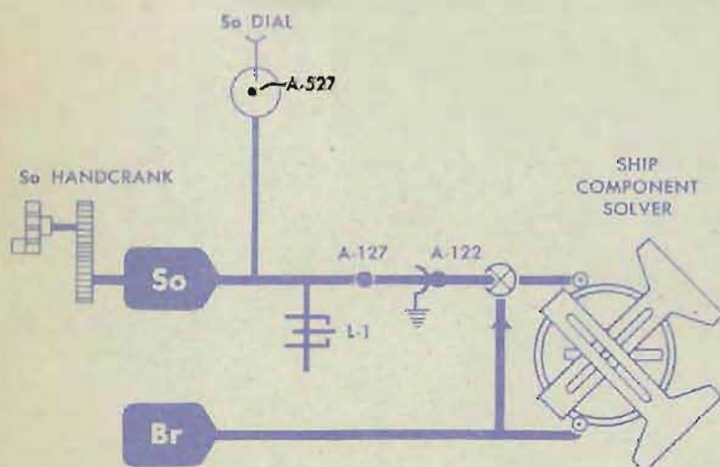
L-1 is under cover 1, to the right of the ship dial group, under the top plate. It may be seen through the opening to the rear of the time motor regulator, above the height computer.

Check

The So dial should read 0 knots at the lower limit and 45 knots at the upper limit.

CAUTION

If any restriction is felt in the line before either limit is reached, loosen A-127 and readjust it later.



Adjustment

If the So dial does not read 0 knots at the lower limit and 45 knots at the upper limit, loosen A-527. Turn the So input gear to hold the line against the lower limit. Slip the dial to 0.

Tighten A-527, and recheck at the upper limit.

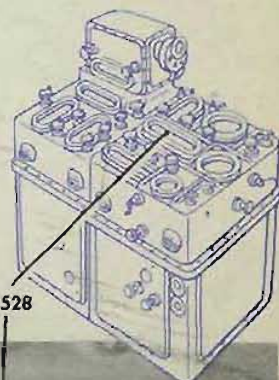
Check A-127 and A-212.

A-528 Sw DIAL to L-3

Location

A-528 is under cover 1, on the Sw dial.

L-3 is near the Sw input gear with its lower limit toward the input gear.

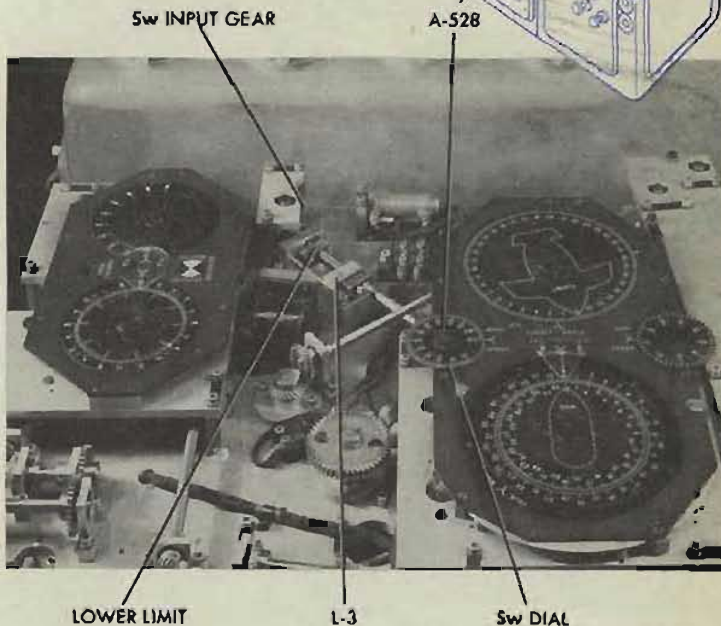


Check

The limits for Sw are 0 and 60 knots. Turn the Sw input gear until the lower limit of the stop is reached. The Sw dial should read 0 knots.

CAUTION

If either end of the limit stop cannot be reached, A-157 may be upset and causing a restriction. Loosen A-157, and readjust it later.



Adjustment

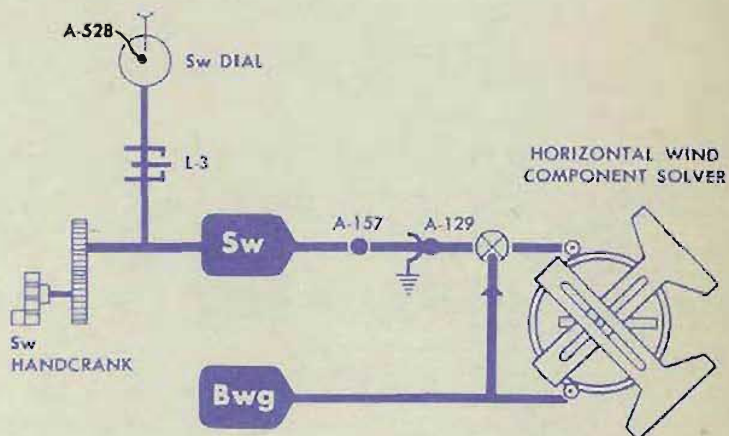
If the Sw dial does not read 0 knots when the stop is at its lower limit, loosen A-528. Hold the line against the stop and slip the dial to 0.

Tighten A-528.

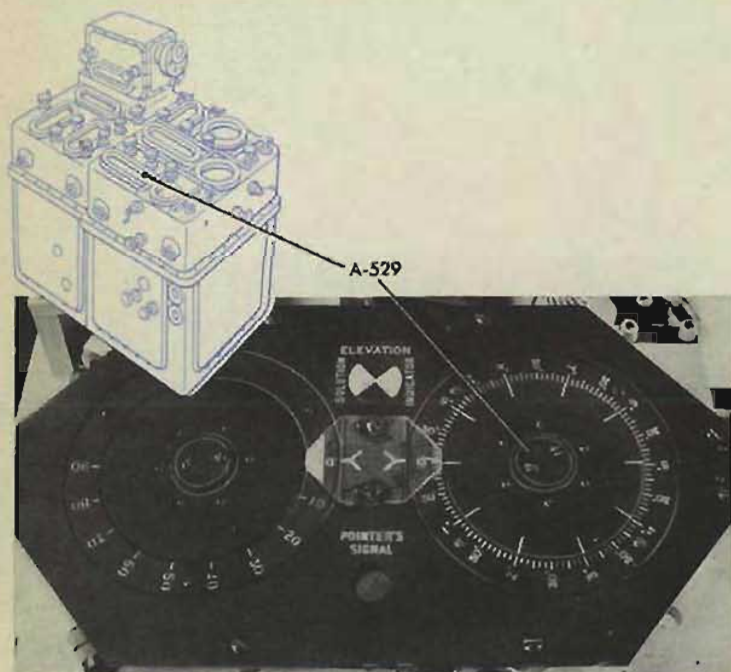
Recheck

Run Sw to the upper limit. The Sw dial should read 60 knots.

Check A-157.



A-529 FINE *cE* DIAL to FINE E DIAL



Location

A-529 is under cover 1, on the fine *cE* dial.

Check

Set *E* at 0°.

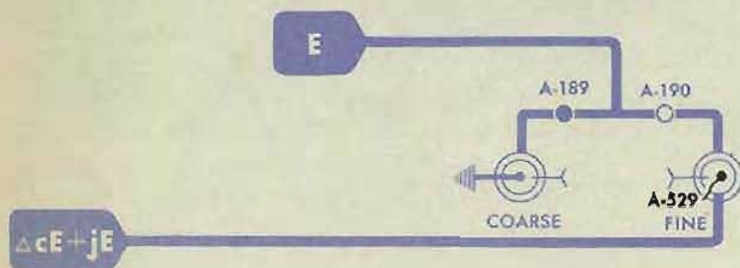
Turn the power ON.

Turn the control switch to AUTO.

One index on the fine *cE* dial should match the fixed index, within ± 4 minutes.

On Ser. Nos. 100 and lower, the pointer should match the fixed index, within ± 4 minutes.

NOTE: The tolerance of ± 4 minutes allows for the wide contact spacing on the *jE* follow-up.



Adjustment

If one *cE* index, or the pointer, does not match the fixed index, loosen A-529, and slip the dial to the matched position. (Split the 8 minutes' dead space.)

Tighten A-529 and recheck.

A-530 COARSE *cE* DIAL to COARSE E DIAL

Location

A-530 is under cover 1, on the coarse *cE* dial, on instruments with Ser. Nos. 100 and lower.

Check

Set *E* at 0°.

Turn the power ON.

Turn the control switch to AUTO.

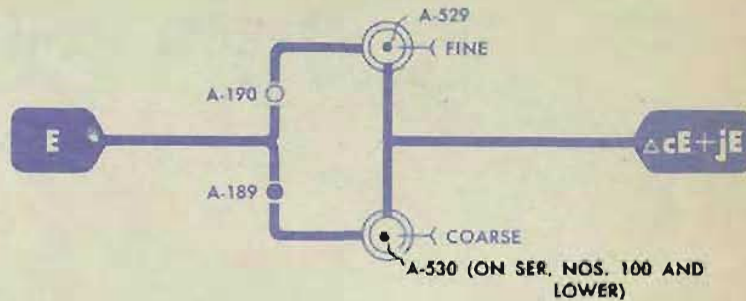
One graduation on the coarse inner dial should match the 0 of the ring dial.

Adjustment

If one graduation does not match the 0 of the ring dial loosen A-530.

Slip the dial to the matched position.

Tighten A-530, and recheck.



A-531 SHIP DIAL to Br DIALS

Location

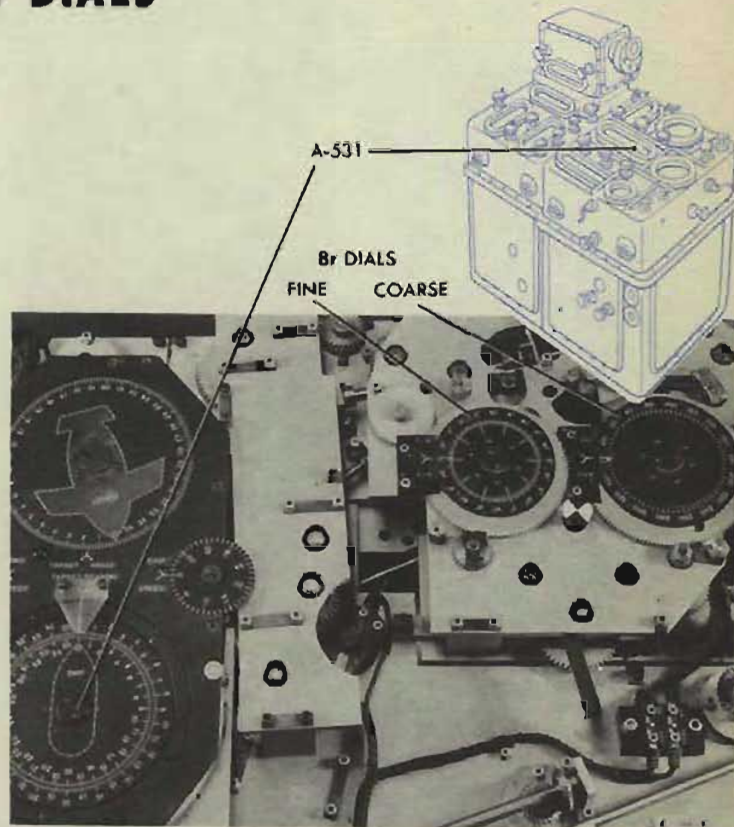
A-531 is under cover 1, on the ship dial.

Check

Turn the power ON.

Set *Br* at 0°.

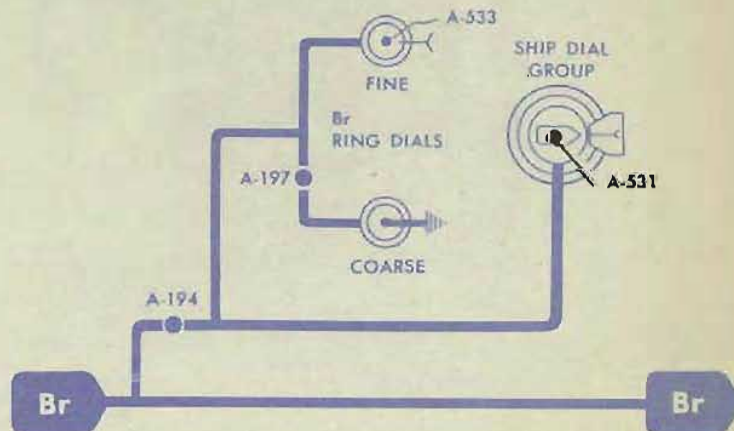
The ship dial should read 0° at the fixed index when the *Br* dials read 0°.



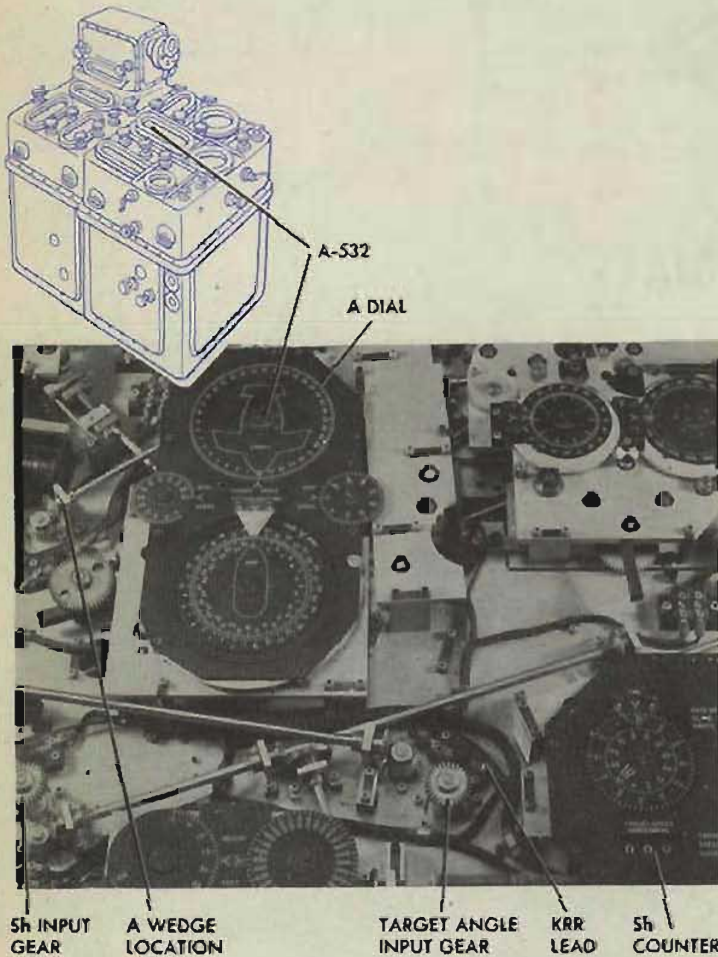
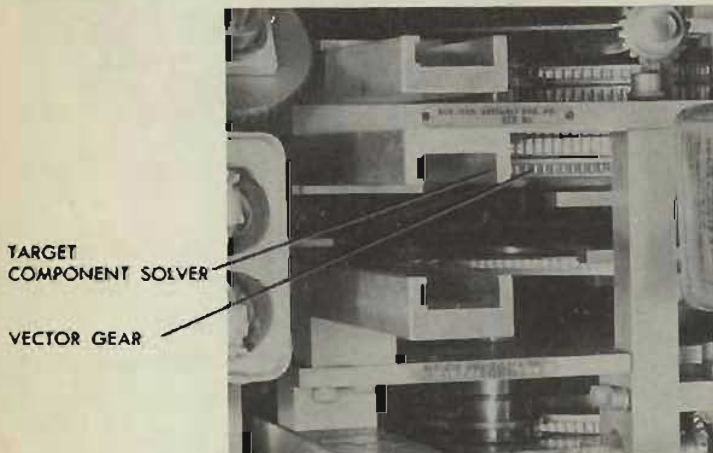
Adjustment

If the ship dial does not read 0°, wedge the *Br* line at 0° and loosen A-531. Slip the ship dial to read 0°.

Tighten A-531 and recheck by moving *Br* off 0° and bringing it back on. Observe whether the ship dial readings continuously match the *Br* dial readings.



A-532 A DIAL to TARGET COMPONENT SOLVER

Sh INPUT
GEARA WEDGE
LOCATIONTARGET ANGLE
INPUT GEARKRR
LEADSh
COUNTERTARGET
COMPONENT
SOLVERVECTOR
GEAR

Location

A-532 is under cover 1, on the A dial.

Check

Disconnect the KRR lead on the target angle push-button switch.

Turn the power ON.

Set *A* at 0° , and wedge the input gear. The vector gear slot of the target component solver should be toward the front.

The vector gear can be seen through an access at the right side of the front top section, in front of the *RdB*s follow-up. The target component solver is the second component solver from the top.

Set *Sh* at 0 knots.

Mark the *RdB*s follow-up output gear for use as an indicator.

Run *Sh* from 0 to 400 knots.

The follow-up indicator marks should remain matched for full travel of *Sh*.

Adjustment

If the marks do not remain matched, remove the wedges from the A line and turn the A input until the marked gear has returned to its original position.

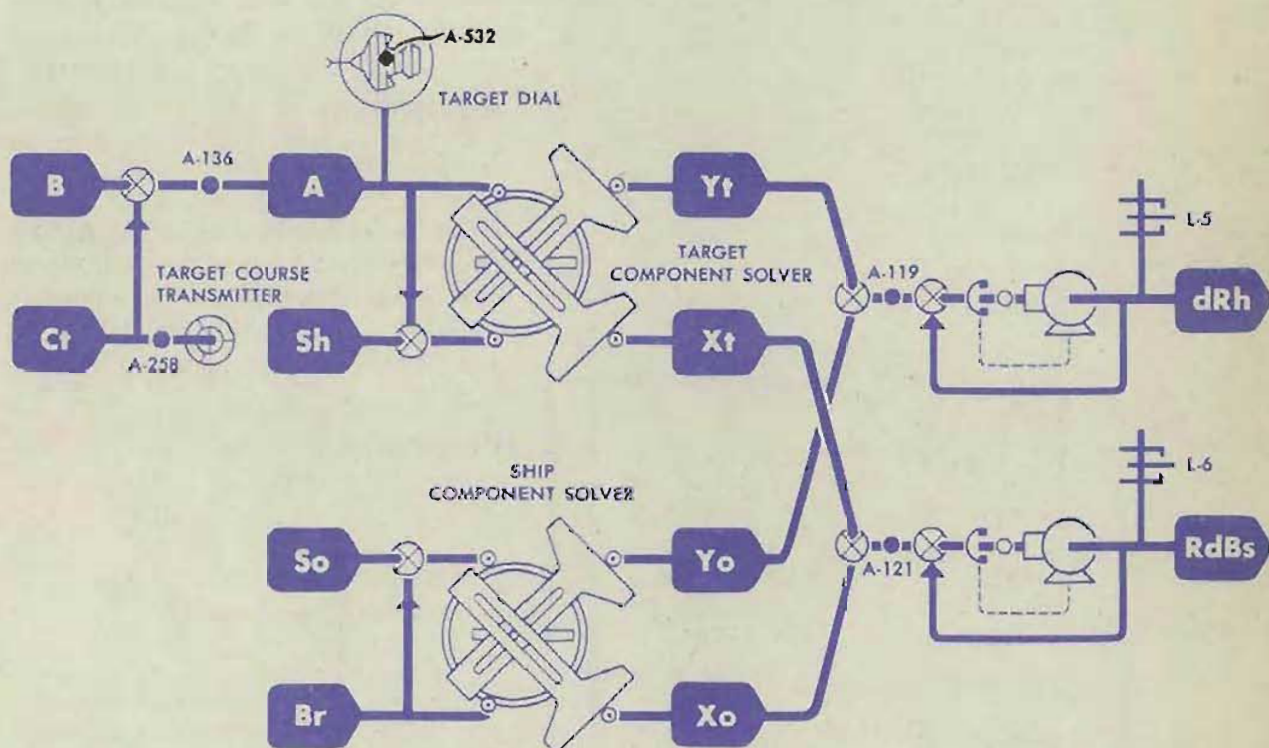
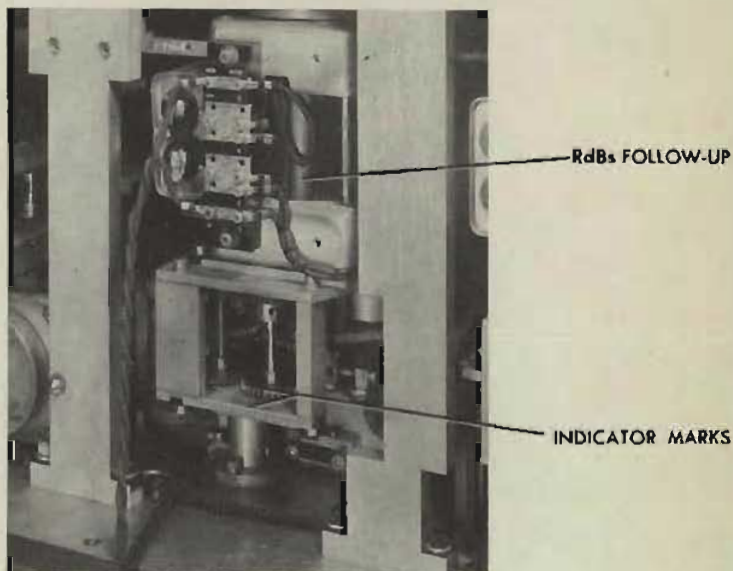
When the error is corrected, wedge the A line.

Loosen A-532 and set the A dial at 0°.

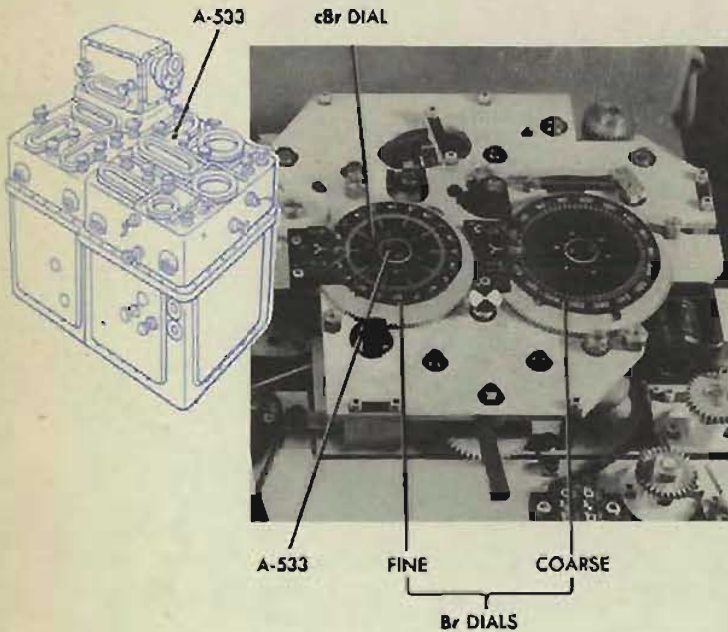
Tighten A-532 and recheck. The final error should be less than one-half-tooth movement of the indicating gear. Turn A to 180° and repeat the check, splitting any lost motion.

Remove all wedges, and replace the KRR lead.

Check A-119, A-121, A-136, and A-258.



A-533 FINE cBr DIAL to FINE Br DIAL



Location

A-533 is under cover 1, on the fine cBr dial.

Check

Turn the power ON.
 Set Br at 0°.
 Turn the control switch to AUTO.
 One of the index marks of the fine cBr dial should match the 0° graduation of the fine Br dial, within ± 7 minutes.

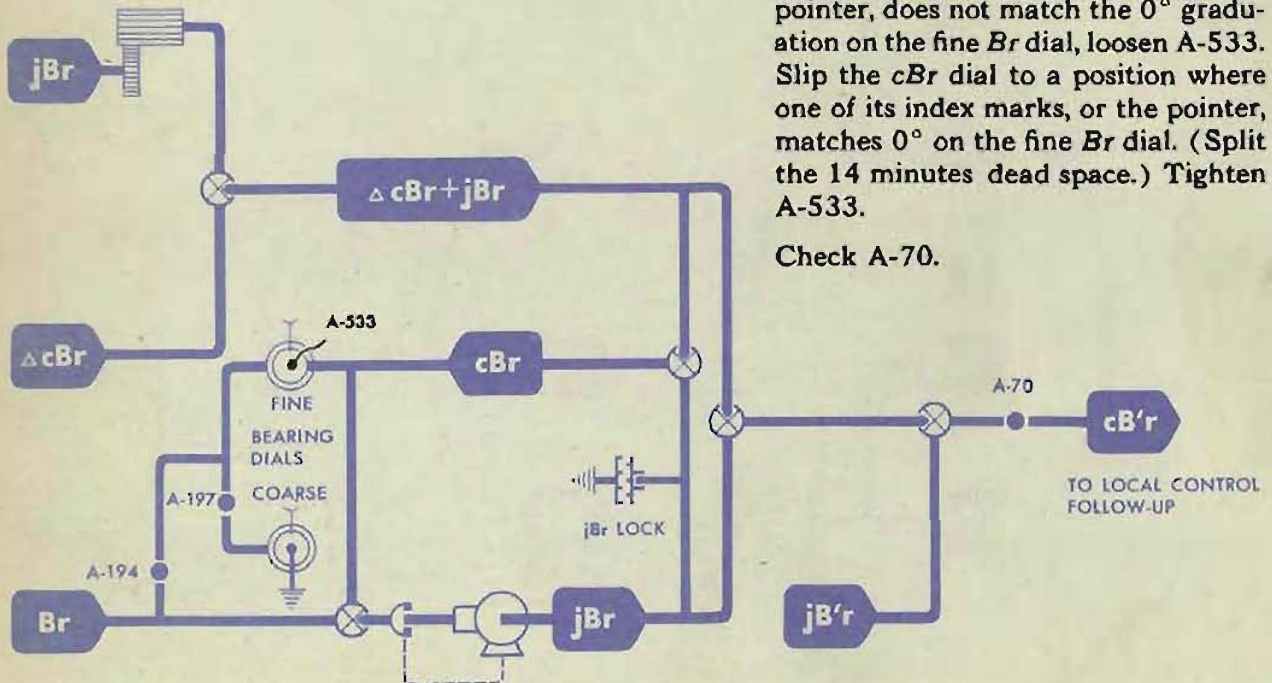
On instruments with Ser. Nos. 100 and lower, the pointer should match the 0° graduation of the ring dial within ± 7 minutes.

NOTE: The tolerance of ± 7 minutes allows for the wide contact spacing on the jBr follow-up.

Adjustment

If one of the cBr index marks, or the pointer, does not match the 0° graduation on the fine Br dial, loosen A-533. Slip the cBr dial to a position where one of its index marks, or the pointer, matches 0° on the fine Br dial. (Split the 14 minutes dead space.) Tighten A-533.

Check A-70.



A-534 COARSE cBr DIAL to COARSE Br DIAL

Location

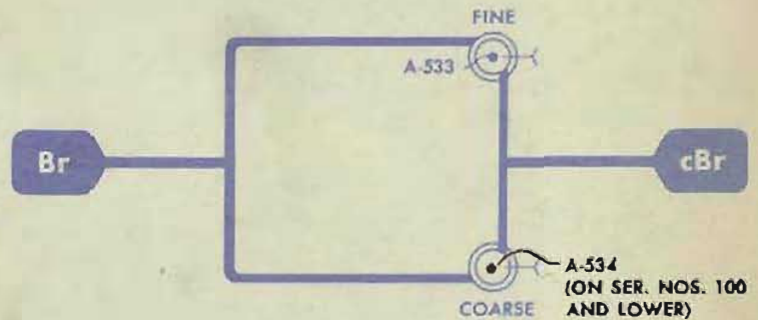
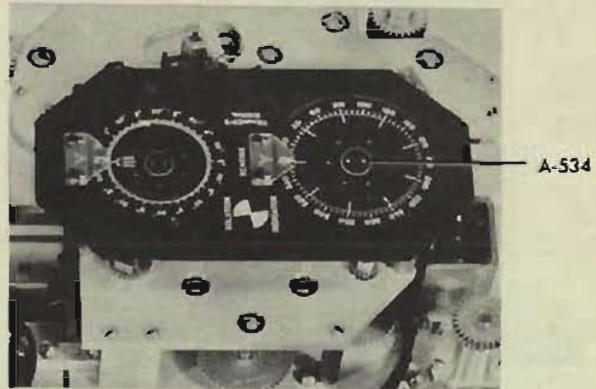
A-534 is under cover 1, on the coarse cBr dial, on instruments with Ser. Nos. 100 and lower.

Check

Turn the power ON.
Set Br at 0°.
Turn the control switch to AUTO.
One graduation of the coarse inner dial should match the 0 of the ring dial.

Adjustment

If one graduation does not match the 0 of the ring dial, loosen A-534.
Slip the dial to the correct position.
Tighten A-534, and recheck.



A-535 Tg DIAL to L-14, or L-38

Location

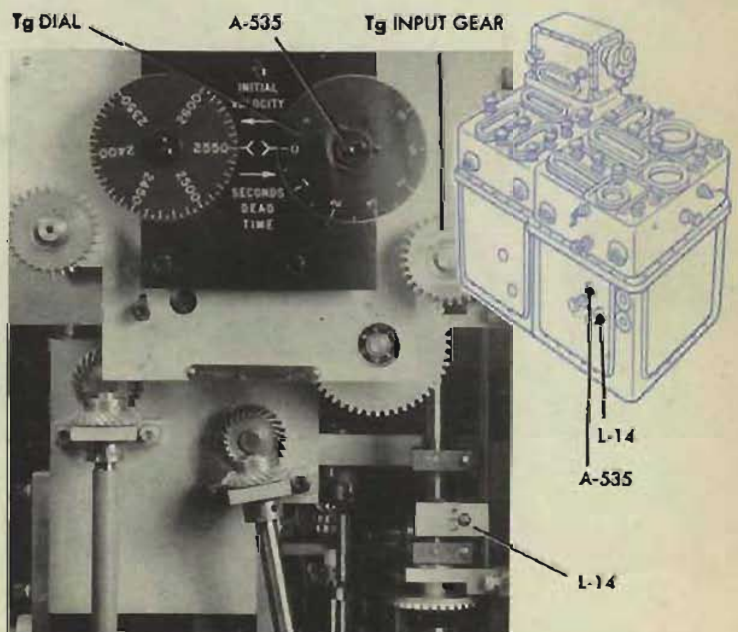
A-535 is under cover 3, on the Tg dial.
L-14 is below the Tg input gear, in a vertical position with its lower limit at the bottom.

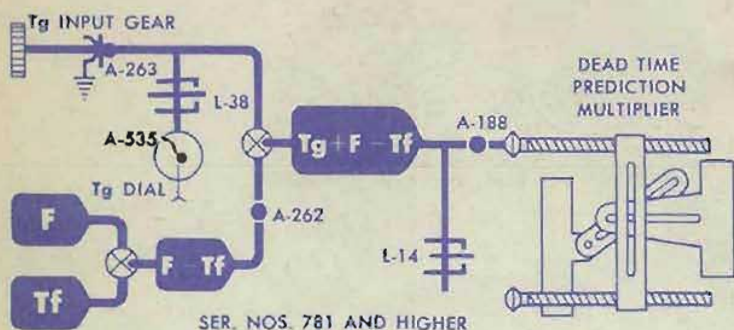
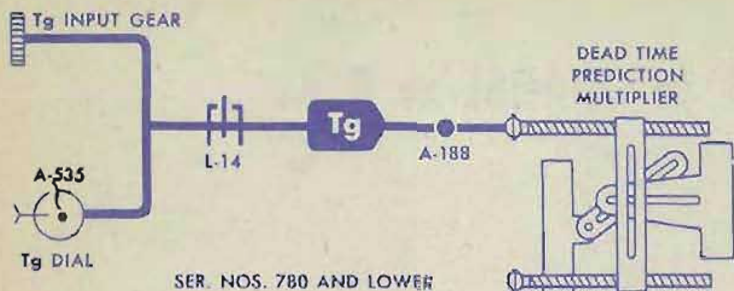
L-38 is on a spur gear behind the Tg dial, on Ser. Nos. 781 and higher.

Check

The Tg dial should read 0 seconds at the lower limit and 6 seconds at the upper limit.

Turn the Tg input gear and read the limit values on the Tg dial.





CAUTION

If either limit cannot be reached, loosen A-188.

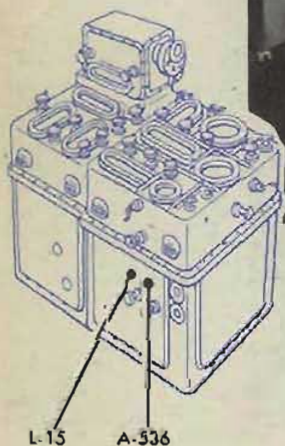
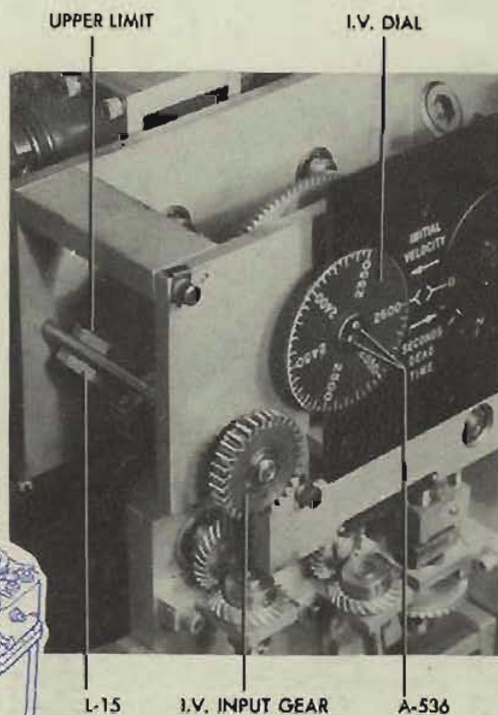
Adjustment

If the T_g dial does not read the proper values, hold the line against the lower limit, loosen A-535, and slip the T_g dial to 0.

Tighten A-535, and recheck at the upper limit.

Check A-188 and A-262.

A-536 I. V. DIAL to L-15



Location

A-536 is under cover 3, on the I.V. dial.

L-15 is under cover 3, behind the I.V. input gear. The upper limit is at the inner end.

Check

On most instruments the limits are 2350 f.s. and 2600 f.s.

On Mods 8 and 12, the limits are 2400 and 2650 f.s.

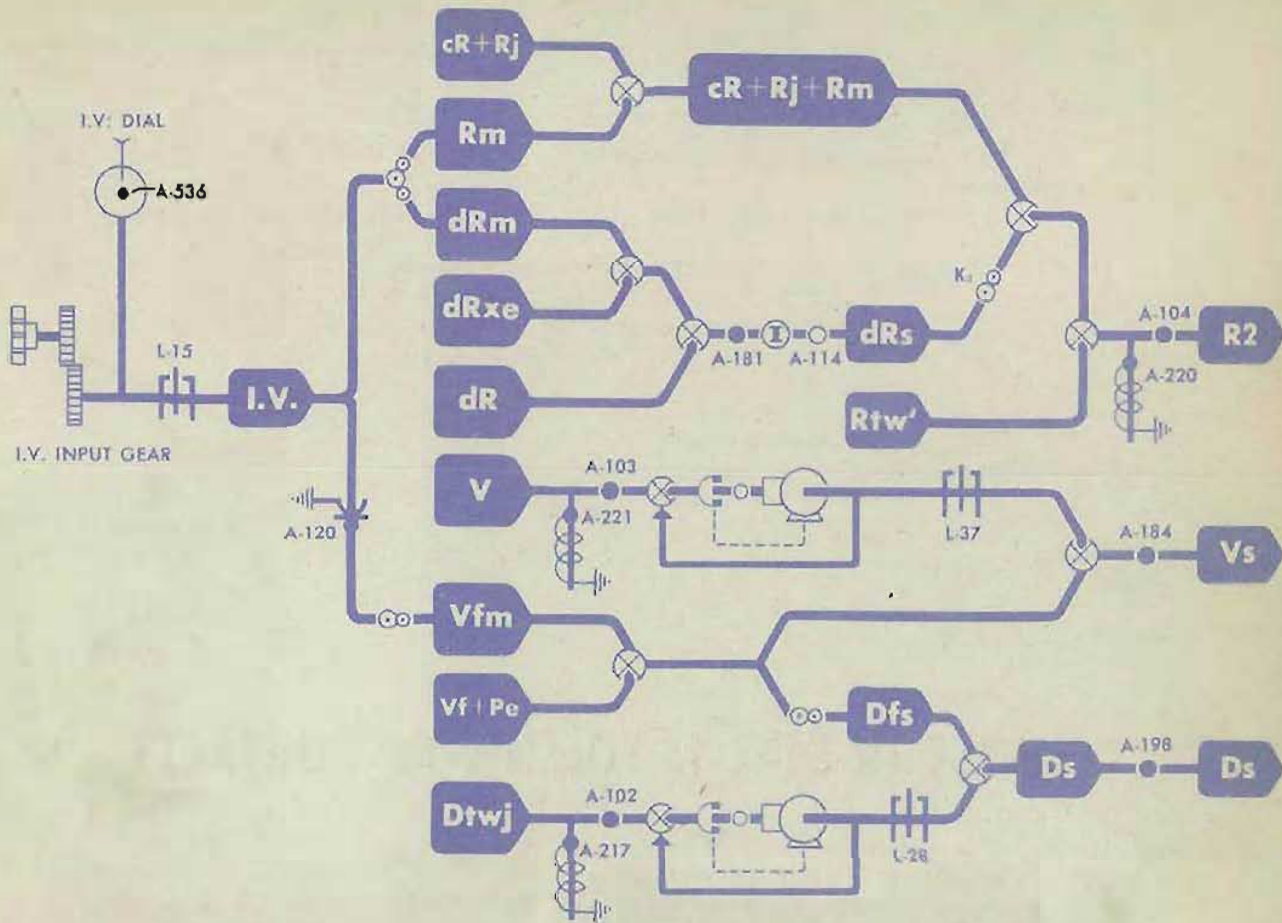
Turn I.V. to each limit. If the I.V. dial reads incorrectly, readjust A-536.

Adjustment

Loosen A-536. Hold the I.V. line against one limit and slip the dial to the correct value. Tighten A-536, and recheck at the other limit.

Check A-102, A-103, A-104, A-181, A-198 and A-184.

On instruments with Ser. Nos. 781 and higher, also check A-132.



A-545 FINE cR DIAL to FOLLOW-UP CONTACTS

Location

A-545 is under cover 1, on the fine cR ring dial.

Check

Transmit 10,000 yards range from the director.

Keep the range finder's signal button depressed.

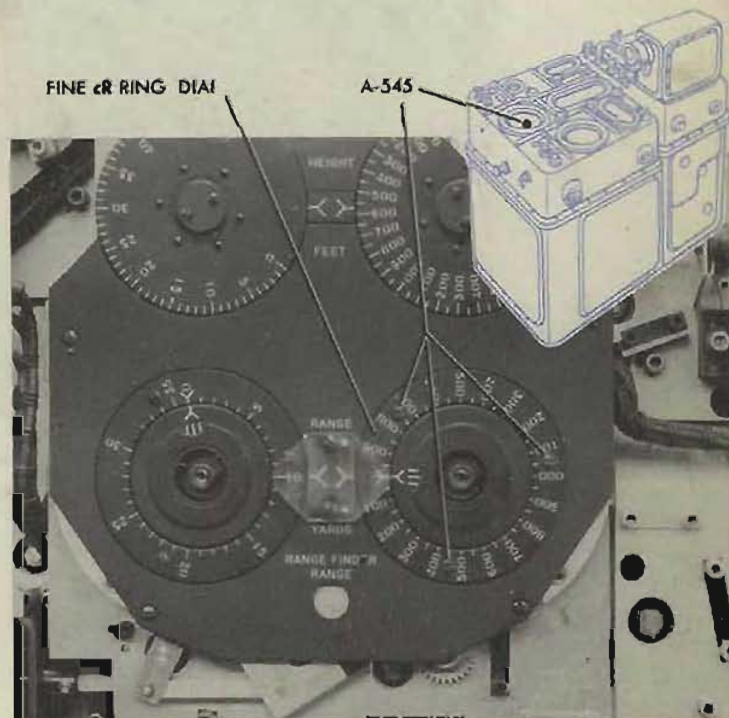
Turn the power ON.

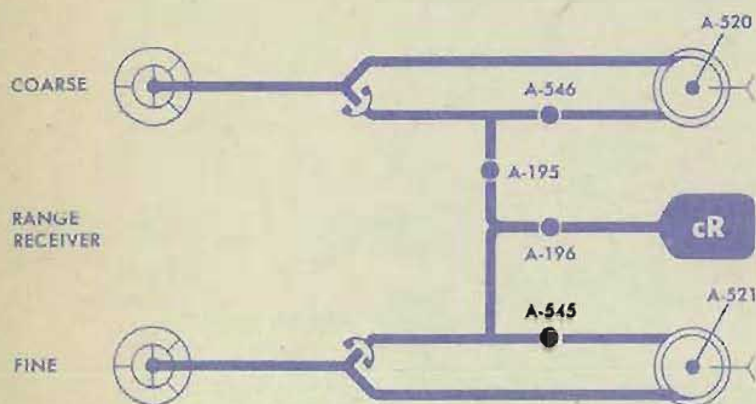
Turn the range rate control switch to AUTO.

The index of the fine ring dial should match the index of the fine inner dial.

Adjustment

If the index of the fine cR ring dial does not match the index of the fine inner dial, loosen A-545 and slip the ring dial until the indexes match.

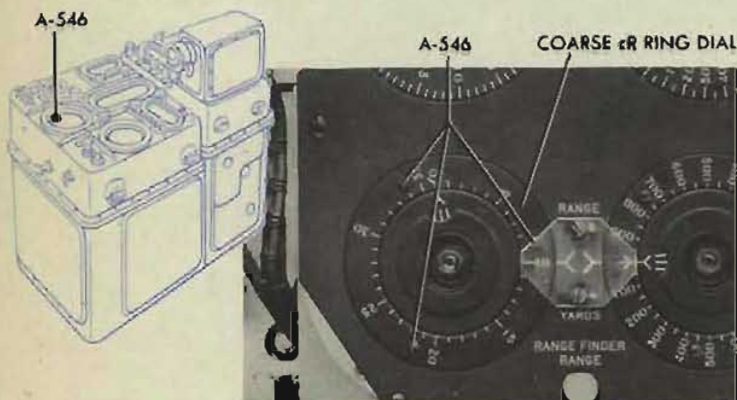




Tighten A-545 and recheck.

Check A-195 and A-521.

A-546 COARSE cR DIAL to FOLLOW-UP CONTACTS



Location

A-546 is under cover 1, on the coarse cR ring dial.

Check

Transmit 10,000 yards range from the director.

Keep the range finder's signal button depressed.

Turn the power ON.

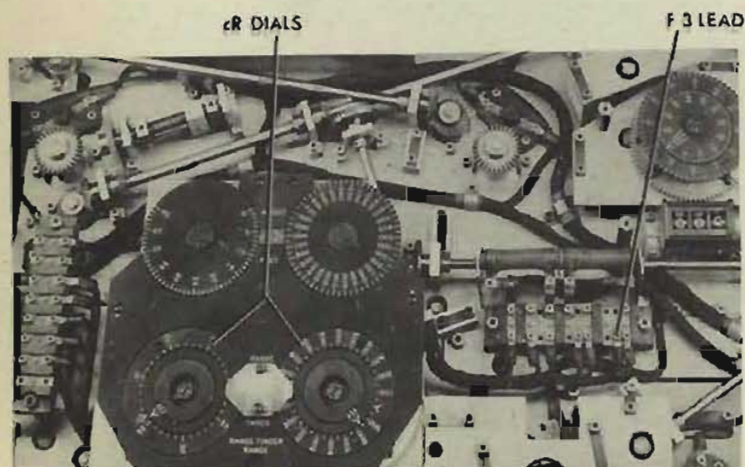
Turn the range rate control switch to AUTO.

Disconnect the F3 fine control lead from the terminal block at the right of the cR dials.

Turn cR until the *jdR* follow-up opposes further travel. Read cR.

Turn cR in the opposite direction until the *jdR* follow-up opposes further travel. Again read cR.

With cR at the midpoint between the two readings, the index on the coarse ring dial should match the index on the coarse inner dial.



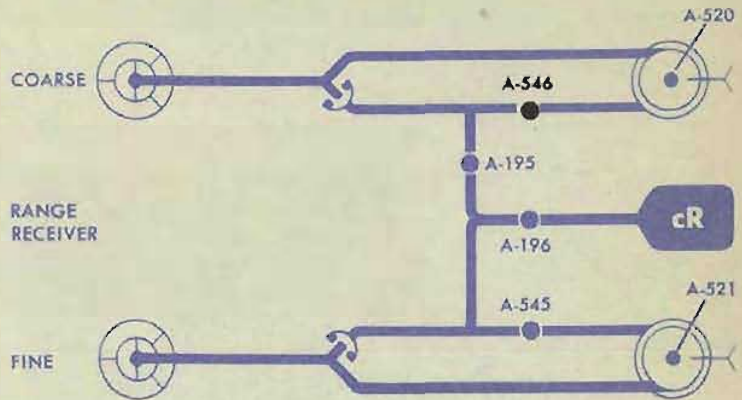
Adjustment

If the indexes do not match at the midpoint of the dead space, loosen A-546 and slip the ring dial until they do match.

Tighten A-546, and recheck.

Replace the F3 lead.

Check A-520 and A-195.



A-548 DIAL to SYNCHRO – Pv TRANSMITTER

Location

A-548 is under cover 6, on the dial of the Pv transmitter.

A-548 is omitted on Mods 0, 1, 2, 3, 4, 6, 9, and 10.

Check

Loosen A-228 to disconnect the Pv line.

Set the synchro of the Pv transmitter on electrical zero.

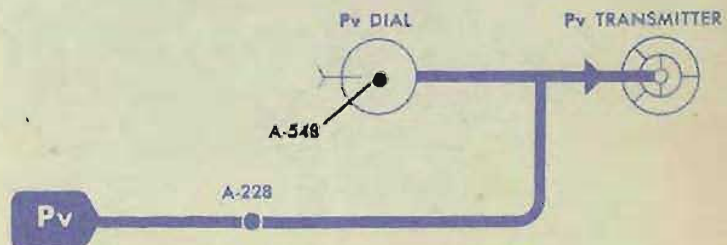
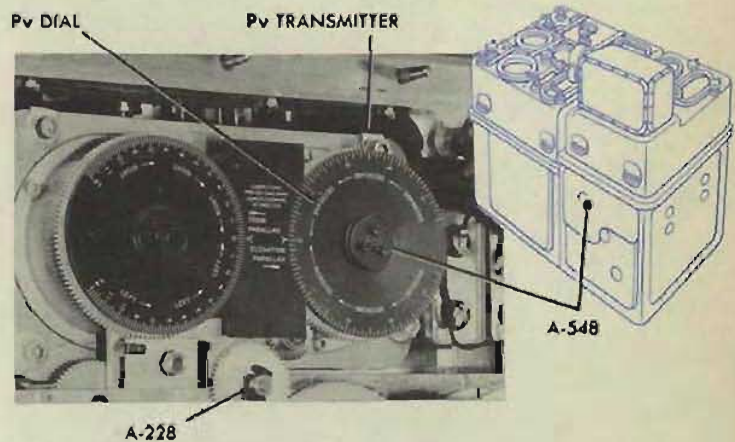
The Pv dial should read 0°.

Adjustment

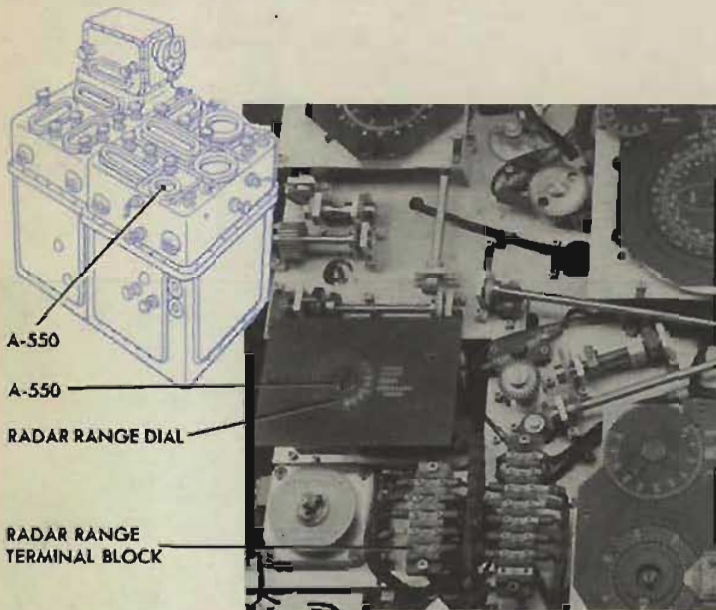
If the Pv dial does not read 0°, loosen A-548, and slip the dial to its proper reading.

Tighten A-548, and recheck.

Readjust A-228.



A-550 DIAL to SYNCHRO—RADAR RANGE RECEIVER



Location

A-550 is under cover 1, on the radar range dial.

Check

Connect a standard motor (test synchro) to the radar range receiver terminals. When the standard motor is on electrical zero, the radar range dial should read 10,000 yards.

Adjustment

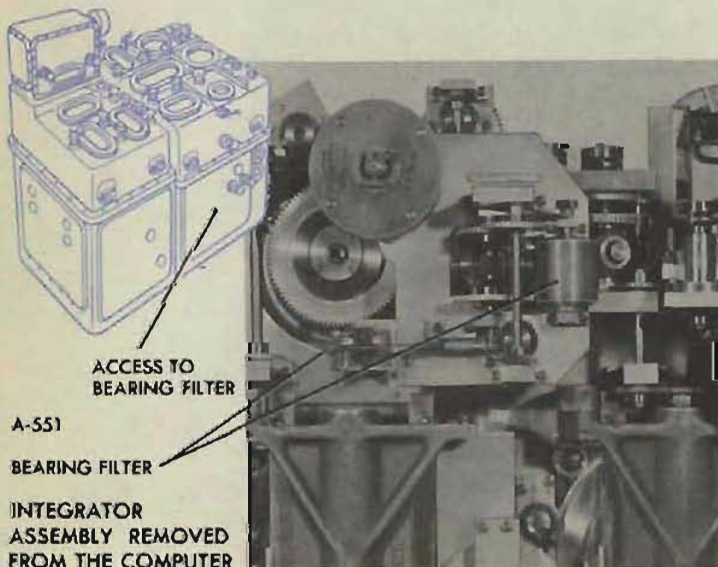
If the radar range dial does not read 10,000 yards when the receiver is on electrical zero, loosen A-550. Hold the receiver on electrical zero, and slip the dial to its proper value.

Tighten A-550, and recheck.

Disconnect the standard motor from the terminals.



A-551 BEARING FILTER SPRING TENSION



Location

A-551 is under cover 3. It is a nut adjustment on the spring in the bearing filter.

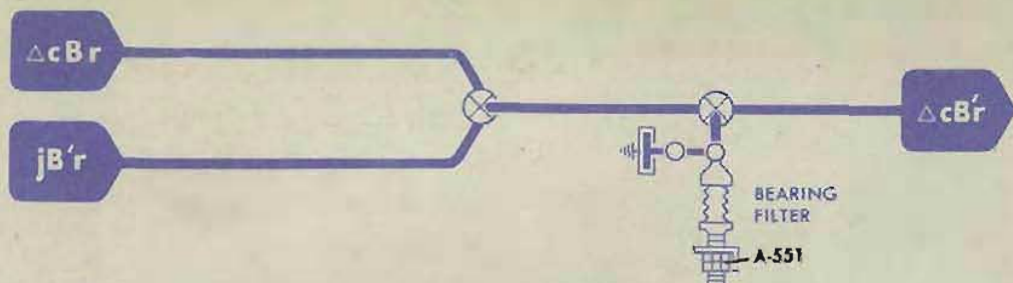
It is omitted on Mod 0.

Check

The spring supports should be 1.57 inches apart.

Adjustment

Loosen the locking nut. Turn the adjusting nut until the spring supports are the proper distance apart. Tighten the locking nut.



A-601 COMPUTER L DIALS to STABLE ELEMENT L DIALS

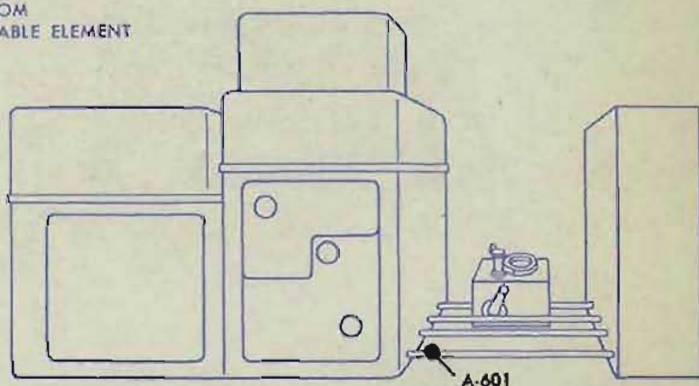
Location

A-601 is a clamp on the *L* shaft between the stable element and the computer.



Check

Set *L* at 2000' at the stable element. The computer *L* dials should read 2000'.



Adjustment

If the computer *L* dials do not read 2000', loosen A-601 and turn the *L* stub shaft at the base of the computer until the computer and stable element dials agree. Tighten A-601, and recheck.

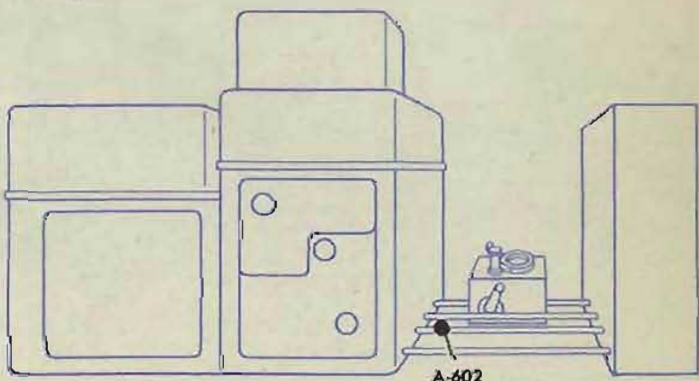


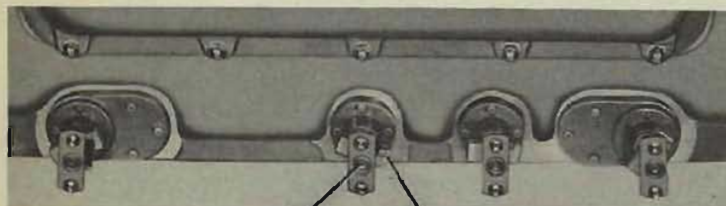
L STUB SHAFT A-601

A-602 STABLE ELEMENT B'r DIALS to COMPUTER B'r LINE

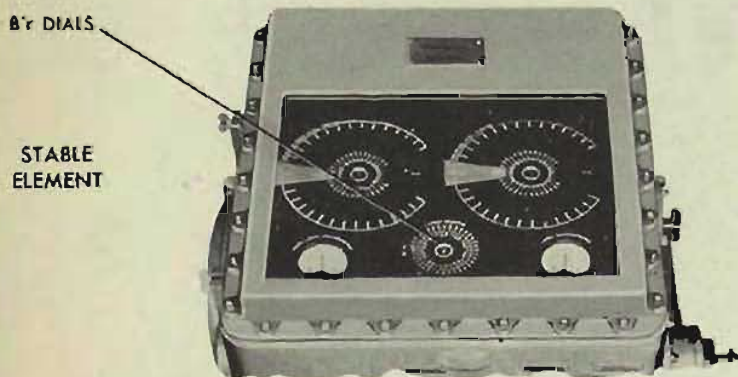
Location

A-602 is a clamp on the *B'r* shaft between the computer and the stable element.





B'r STUB SHAFT
A-602



B'r DIALS
STABLE ELEMENT

Check

Turn the power OFF.
Set *Dd* at 0°, and wedge the line.

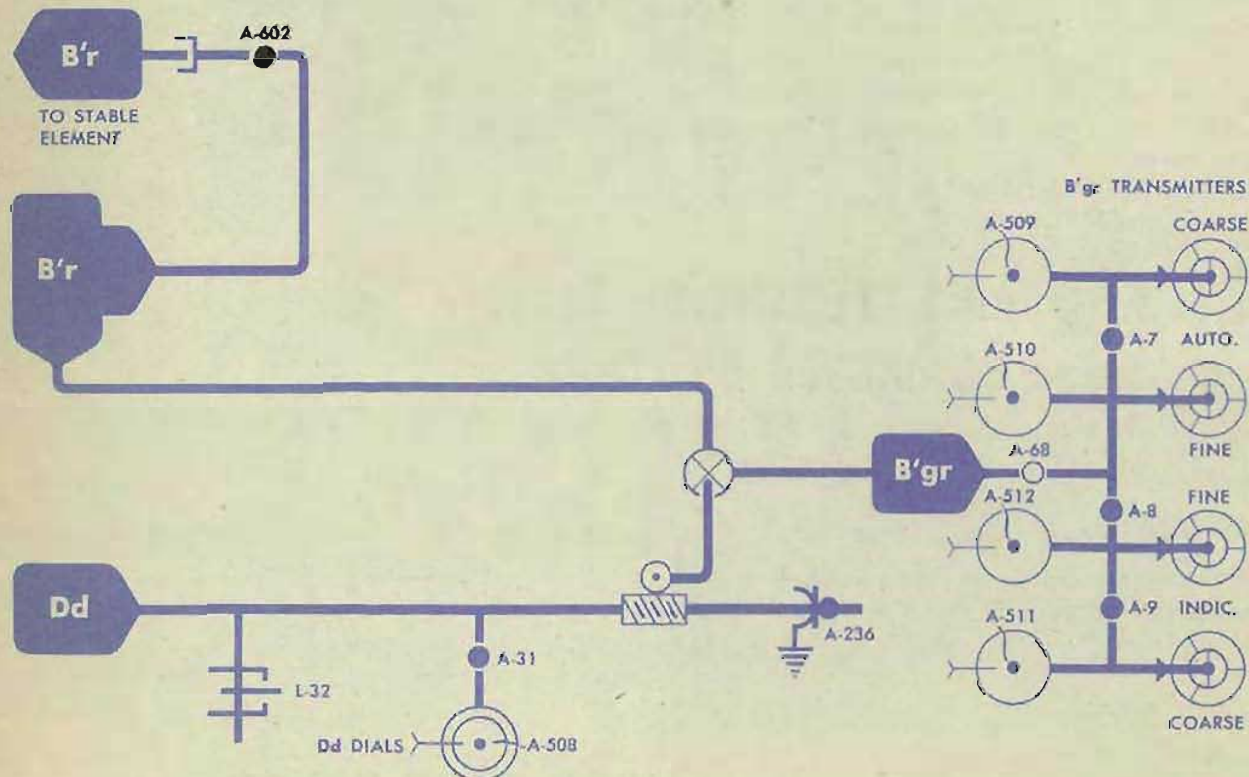
B'r now equals *B'gr*.

The reading on the stable element *B'r* dials should be the same as the reading on the computer *B'gr* dials.

Adjustment

If the stable element *B'r* dials do not agree with the computer *B'gr* dials, loosen A-602 and turn the *B'r* shaft at the base of the stable element until the dials agree.

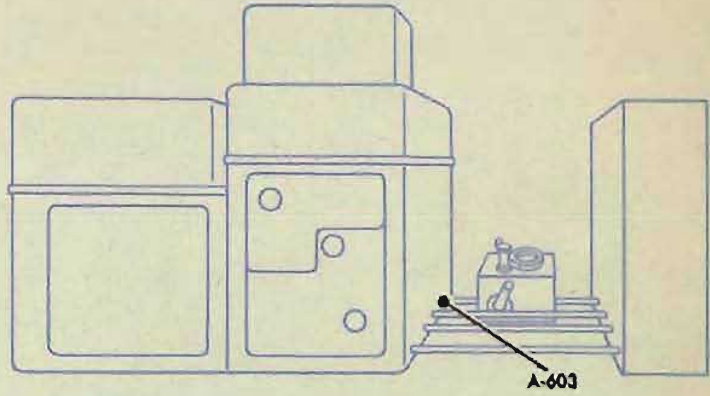
Tighten A-602, and recheck.



A-603 COMPUTER Zd DIALS to STABLE ELEMENT Zd DIALS

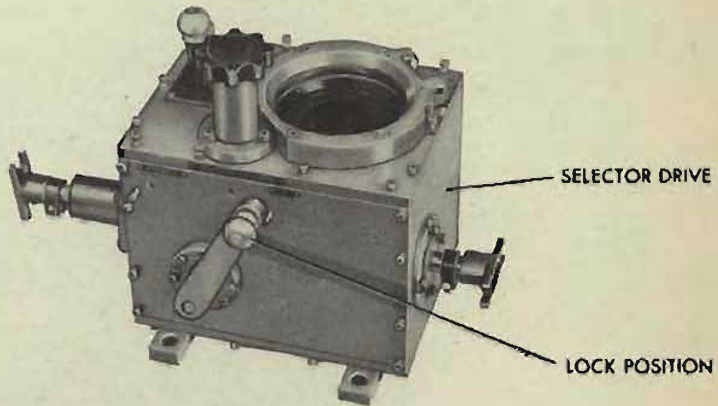
Location

A-603 is a clamp on the *Zd* shaft between the computer and the stable element.



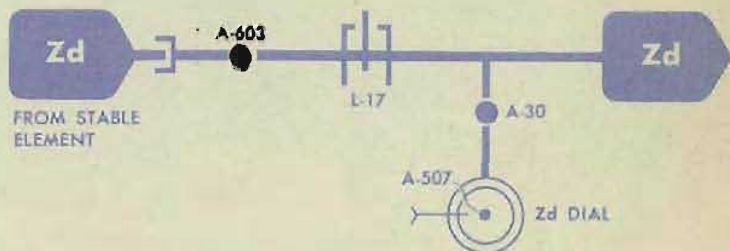
Check

When the selector drive is in the LOCK position, the computer *Zd* dials should agree with the stable element *Zd* dials.



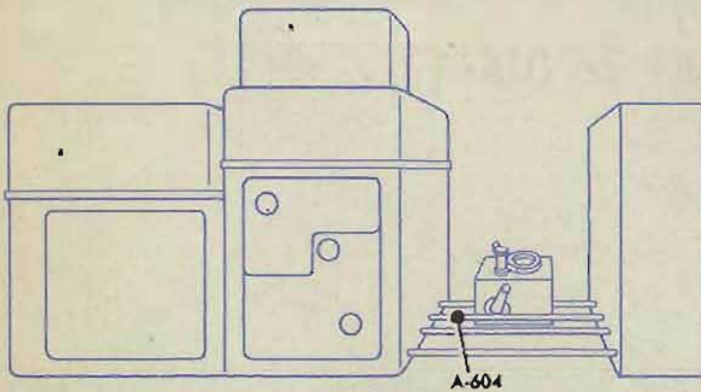
Adjustment

If the computer *Zd* dials do not agree with the stable element *Zd* dials, loosen A-603 and turn the *Zd* stub shaft at the base of the computer until the dials agree.



Tighten A-603, and recheck.

A-604 ASSEMBLY CLAMP



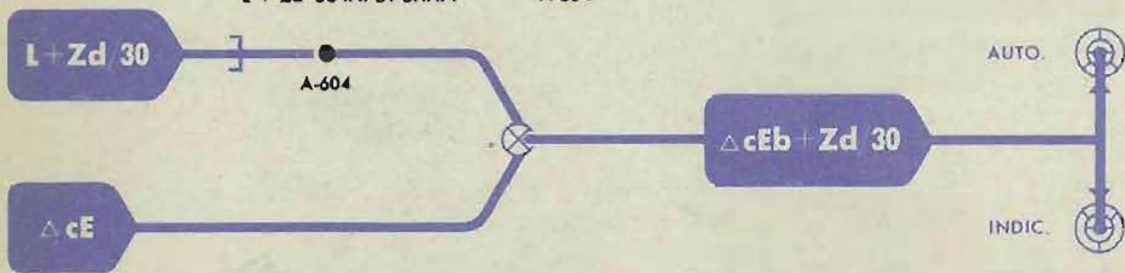
Location

A-604 is on the $L + Zd/30$ shaft, between the computer and the stable element.

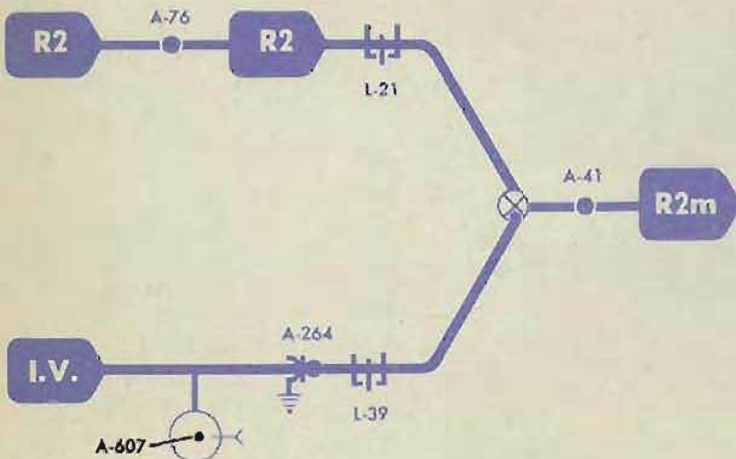
Adjustment

No computer adjustment is necessary since the $L + Zd/30$ input is added only to the ΔcE integrator output.

The clamp must be tight.



A-607 I. V. DIAL to L-39



Location

A-607 is under cover 4, on the *I.V.* dial, on instruments with Ser. Nos. 811 and higher.

Check

The front *I.V.* dial should read 2350 at the lower limit, and 2600 at the upper limit.

Adjustment

If the dial does not read the correct values, hold the line against the stop and loosen A-607. Slip the dial to the correct value.

Tighten A-607 and check at the other limit.

Check A-76.

HANDCRANKS

The handcranks in the computer have various adjustable devices. These are the holding friction, the friction relief drive, and the switch-actuating screw.

Disassembly and repair of a typical handcrank is discussed in OP 1140A.

HOLDING FRICTION

Location

The holding friction is inside the handcrank.

Check

The holding friction should be tight enough to maintain the setting of its quantity under normal operating conditions, yet loose enough for easy operation.

Adjustment

Remove the handcrank from the cover and set it in the outer position. Turn the knob until the adjustment slot appears in the opening; then insert a small screw driver into the slot. Turn the knob clockwise to increase the friction, or counterclockwise to decrease the friction.

FRICION RELIEF DRIVE

Location

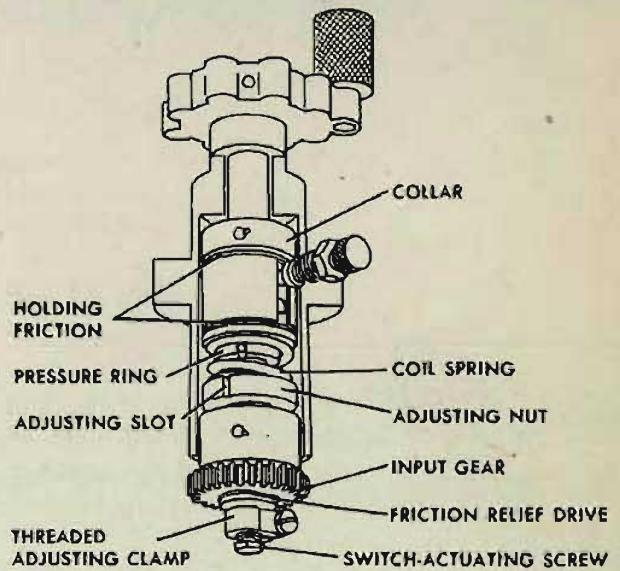
The friction relief drive is at the input gear on the end of the handcrank shaft.

Check

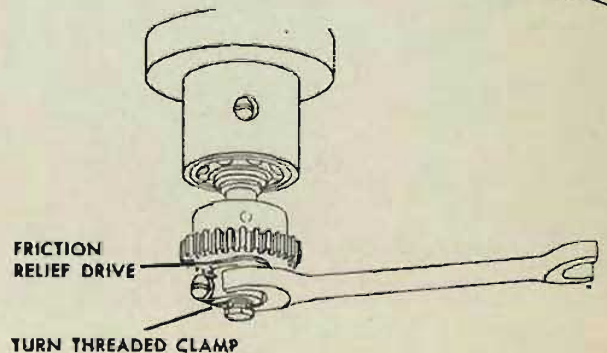
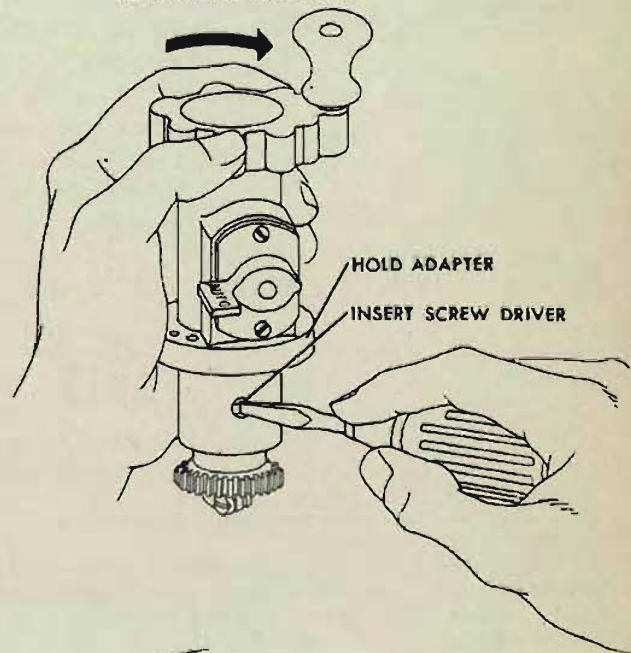
The friction relief drive should be tight enough to drive the line, but loose enough to slip without damaging the shaft line whenever a limit stop is reached.

Adjustment

Loosen the threaded adjustment clamp and turn it clockwise to increase the friction or counterclockwise to decrease the friction. Note that loosening the adjustment clamp also releases the switch-actuating screw. Therefore the screw adjustment should be checked whenever the drive friction is re-adjusted.



TURN KNOB CLOCKWISE TO INCREASE FRICTION



SWITCH-ACTUATING SCREW

Location

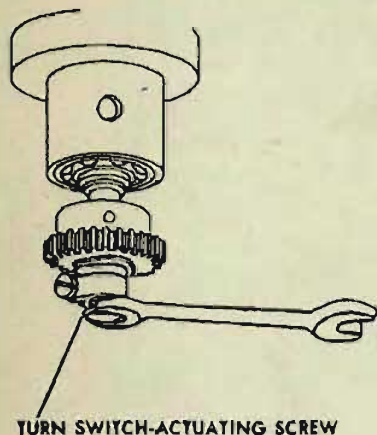
The switch-actuating screw is at the end of the handcrank shaft.

Check

The switch-actuating screw should extend far enough to depress the switch button when the handcrank is at IN or HAND. *It should not extend so far that it damages the switch.*

Adjustment

Loosen the friction relief drive adjustment clamp, but do not turn the clamp because that would change the adjustment of the drive friction. Use a wrench to turn the screw. The screw head must be smooth, because any burr on the surface will dig into the bakelite switch. Make sure that the adjustment clamp is tightened.



CAUTION

When reinstalling a handcrank which has a switch-actuating screw, make sure that the screw does not extend too far. To check this on a plunger-type handcrank, pull the plunger out and gently push the handcrank IN. Travel should be limited by the knob striking the adapter. On a lever-type handcrank, gently turn the switch lever to the HAND position. It should reach its limit stop pin with no restriction. In either type of handcrank, *if the travel is limited by the bottom of the switch, the screw extends too far and the switch will be damaged.*

TABLE

The following table indicates which handcranks have frictions, and which ones operate switches.

HANDCRANK	FRICITION DRIVE	HOLDING FRICTION	OPERATES SWITCH	HANDCRANK	FRICITION DRIVE	HOLDING FRICTION	OPERATES SWITCH
Deflection Spot (Dj)	X	X	X	Target Angle (A)		X	X
Elevation Spot (Vj)	X	X	X	Ship Course (Co)		X	X
Range Spot (Rj)	X	X	X	Wind Direction (Bw)			
Fuze (F)	X	X	X	Range Rate (dR)	X	X	X
Sight Angle (Vs)	X	X	X	Time (T)	X		
Sight Deflection (Ds)	X	X	X	Generated Bearing (jBr)			
Synchronize Elevation	X	Note A	Note B	Generated Elevation (jE)	X		
Wind Speed (Sw)	X			Generated Range (jR)	X		
Ship Speed (So)	X	X	X	Dead Time (Yg)	X		
Target Speed (Sh)	X	X	X	Initial Velocity (I.V.)	X		
Rate of Climb (dH)		X		Range Rate Ratio (Rrr)		X	

Note A: Holding friction to be such that handcrank in IN position rotates when either limit of L-12 is reached.
 Note B: Switch to be open in OUT position, and closed in CENTER and IN positions.

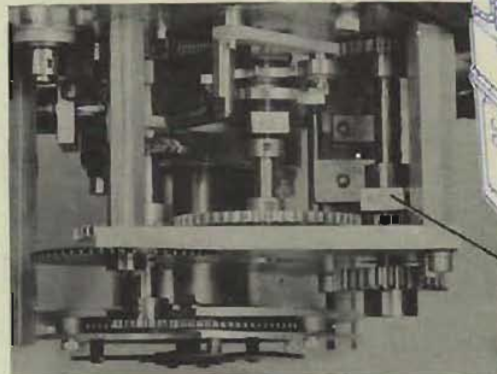
STAR SHELL READJUSTMENT

A-1 ASSEMBLY CLAMP (see A-18)

A-2 Rjn RING DIAL to L-2

Location

A-2 is under the front cover, behind the *Rjn* input.



Check

L-2 should function at:

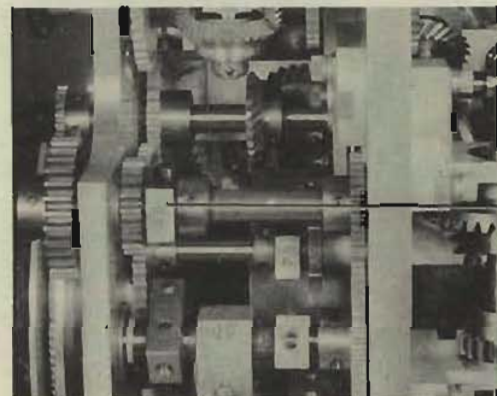
IN 1500 yards and OUT 1500 yards,
on Mod 0.

IN 2857 yards and OUT 1500 yards,
on Mod 1.

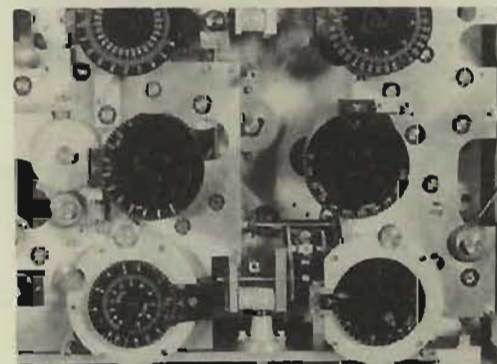
IN 2700 yards and OUT 1500 yards,
on Mod 2.

NOTE: On Mods 1 and 2, the IN limit is indicated by a red dot beyond the IN 1500-yard graduation.

Turn the *Rjn* input in an increasing direction until the limit of the stop is reached. The *Rjn* ring dial should read 1500 yards OUT.



A-2 ON
MODS 1 AND 2



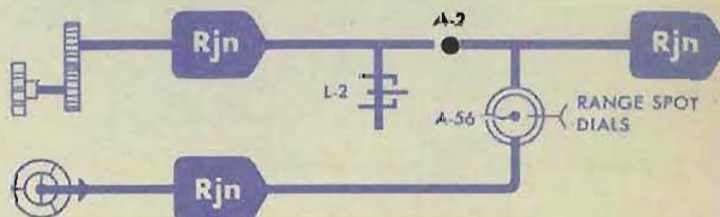
A-2 ON
MODS 1 AND 2

Adjustment

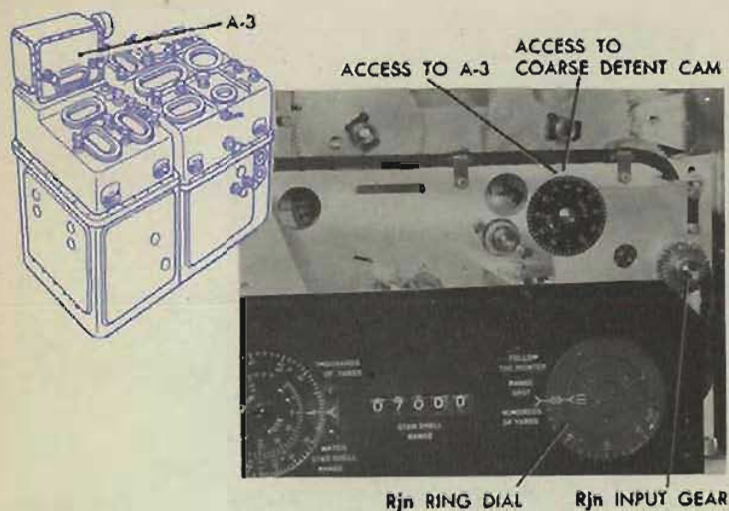
Loosen A-2.

Hold the *Rjn* input gear against the upper limit of the stop. Turn the spur gear in front of A-2 until the ring dial reading is correct.

Tighten A-2 and recheck at the IN limit.

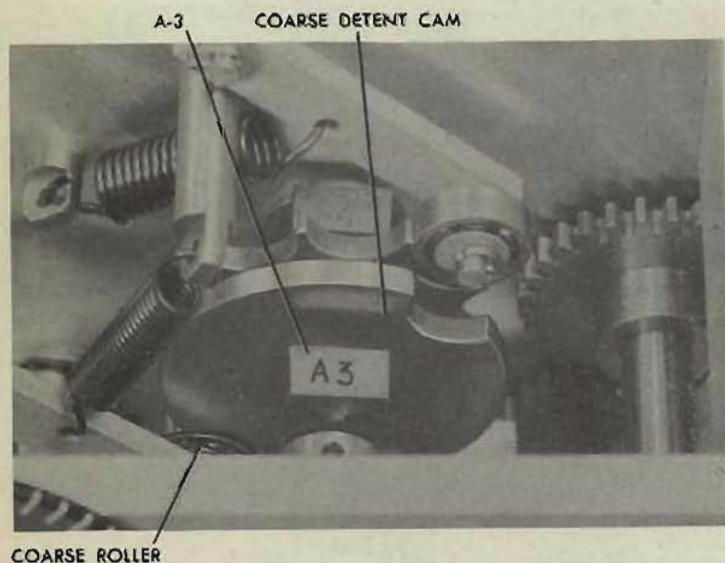


A-3 COARSE DETENT to Rjn RING DIAL



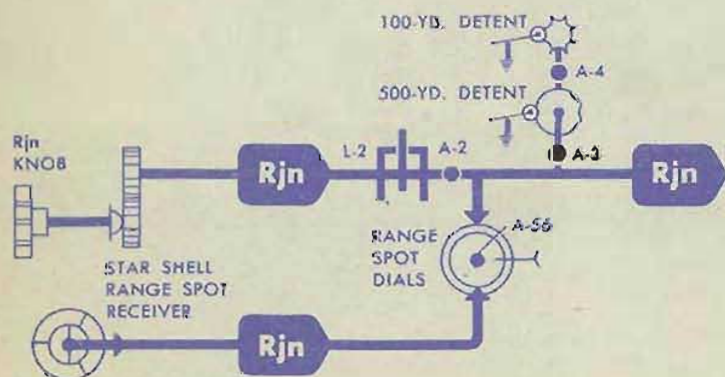
Location

A-3 is under the front cover, on the coarse detent cam, behind the Rjn input. A-3 is omitted on Mods 1 and 2.



Check

Set the Rjn ring dial at 0. Use the Rjn input gear. The coarse detent roller should be in a notch of the coarse cam.



Adjustment

If the coarse detent roller is not in a notch on the coarse cam, loosen A-3. Turn the cam until the detent roller enters either notch.

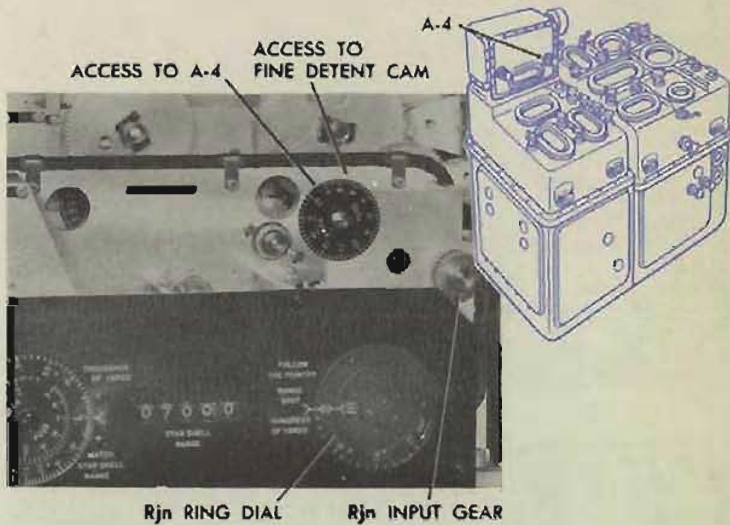
Tighten A-3 and recheck.

The detent should act at every 500-yard setting of the Rjn ring dial.

A-4 FINE DETENT to Rjn RING DIAL

Location

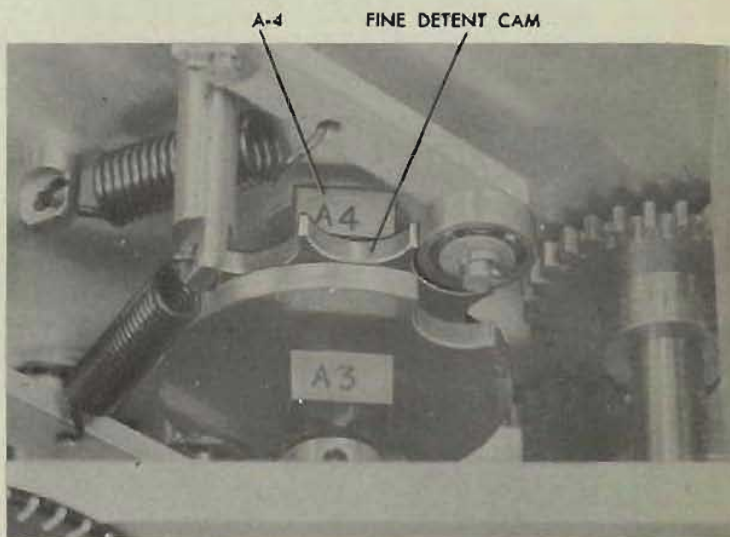
A-4 is under the front cover, on the fine detent cam, behind the Rjn input.



Check

Set the Rjn ring dial at 0. Use the Rjn input gear.

The fine detent roller should be in a notch of the fine cam.

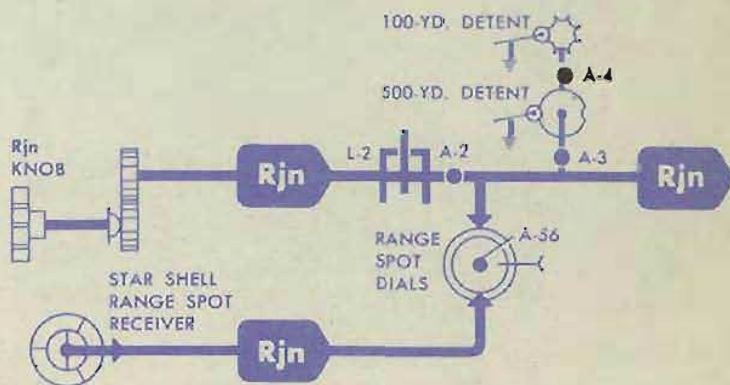


Adjustment

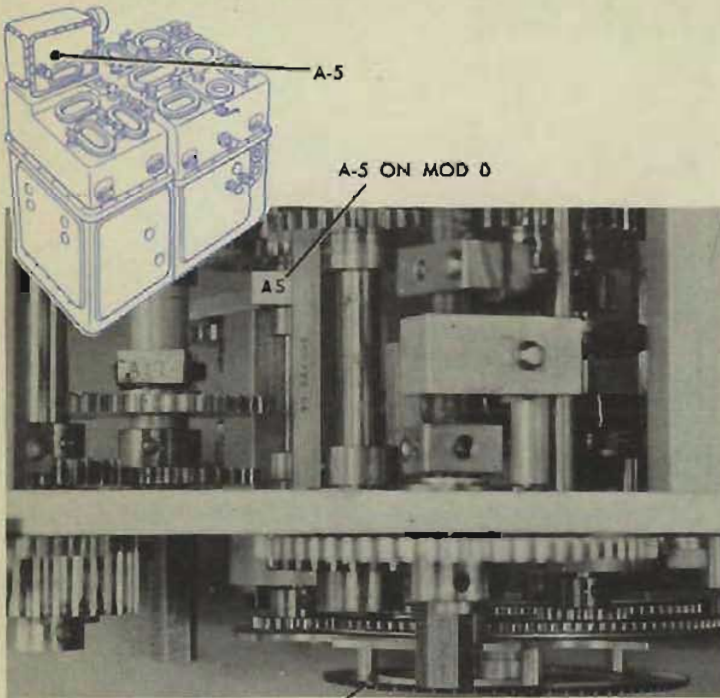
If the fine detent roller is not in a notch of the fine cam, loosen A-4. Turn the cam until the detent roller enters a notch.

Tighten A-4 and recheck.

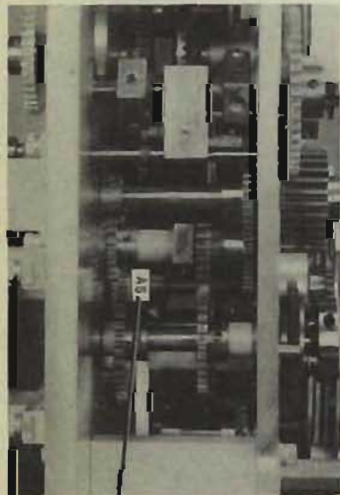
The detent should act at every 100-yard setting of the Rjn ring dial.



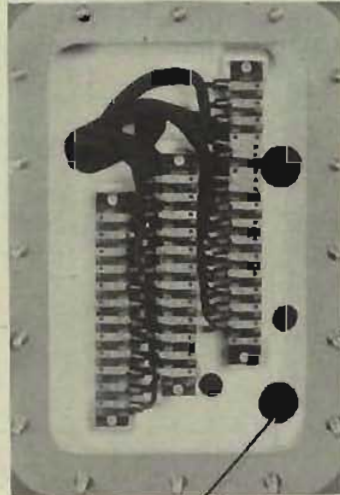
A-5 STAR SHELL RANGE RING DIAL to L-4



STAR SHELL RANGE RING DIAL



A-5 ON MODS 1 AND 2



ACCESS TO A-5 ON MODS 1 AND 2

Location

A-5 is under the front cover. On Mods 1 and 2, A-5 can be reached through an access hole under the junction box cover.

Check

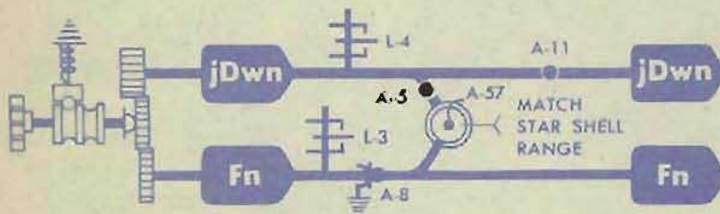
On Mods 0 and 1, L-4 should operate at 4,000 and 15,000 yards on the *jDwn* ring dial. On Mod 2 it should operate at 8,000 and 19,500 yards.

Decrease star shell range to the lower limit of the stop. The *jDwn* ring dial should read 4,000 yards (8,000 yards on Mod 2).

Adjustment

If the *jDwn* ring dial does not read 4,000 yards (8,000 on Mod 2), loosen A-5. Hold the *jDwn* line against the stop and turn the small spur gear at the left of the ring dial until the dial reading is correct.

Tighten A-5, and check at the upper limit. Check A-11 in the star shell computer and A-231 in the Computer Mark 1.



A-6 STAR SHELL DEFLECTION COUNTER to L-1

Location

A-6 is under the rear cover, below the star shell deflection counter.

Check

L-1 should operate at +60 knots (counter reading 060) and -60 knots (counter reading 940).

Turn the power OFF.

Run the *WrD + KRdBs* line to the upper end of the limit stop by turning the spur gear under clamp A-6. The star shell deflection counter should read 060.

Adjustment

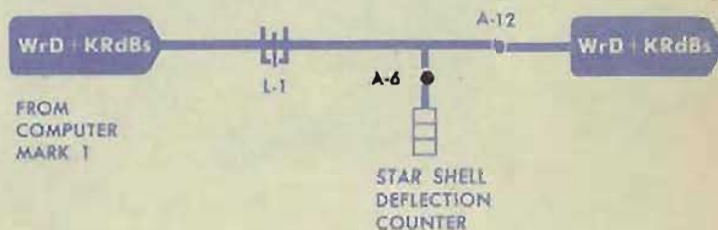
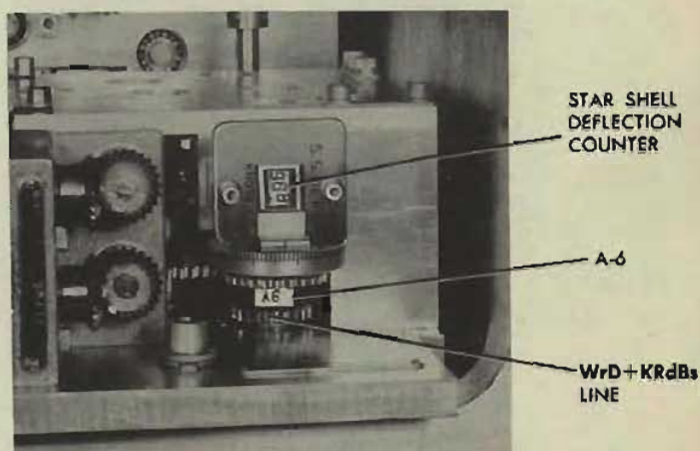
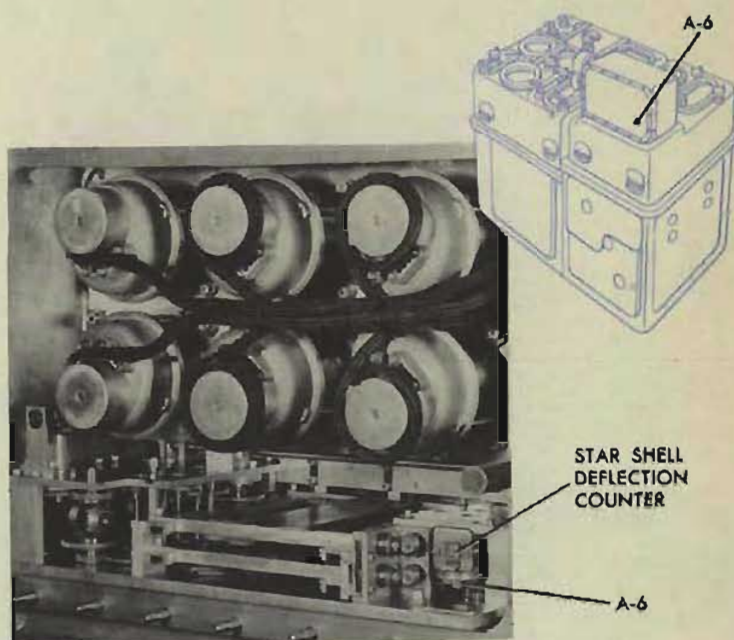
If the counter does not read 060, slip-tighten A-6. Turn the counter gearing until the counter reading is correct.

Tighten A-6, and recheck at the lower limit. Split any overtravel.

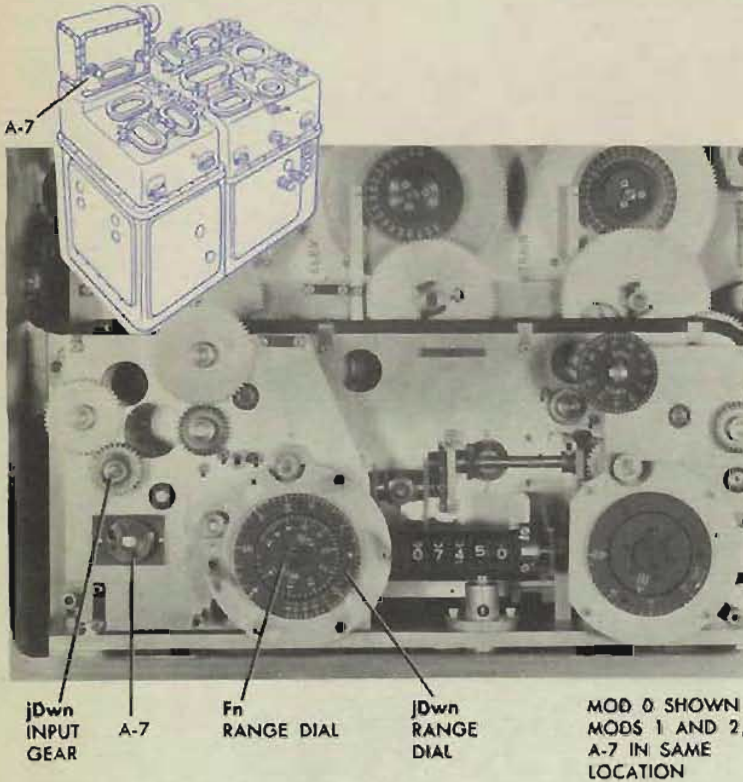
Note

If a long graduation on the drum does not line up with the index when the counter digits are centered, loosen the small clamp on the counter shaft, and align the drum with the counter. Recheck A-6.

Check A-12 in the star shell computer and A-230 in the Computer Mark 1.



A-7 jDwn HOLDING FRICTION



Location

A-7 is under the front cover, below the *jDwn* input gear.

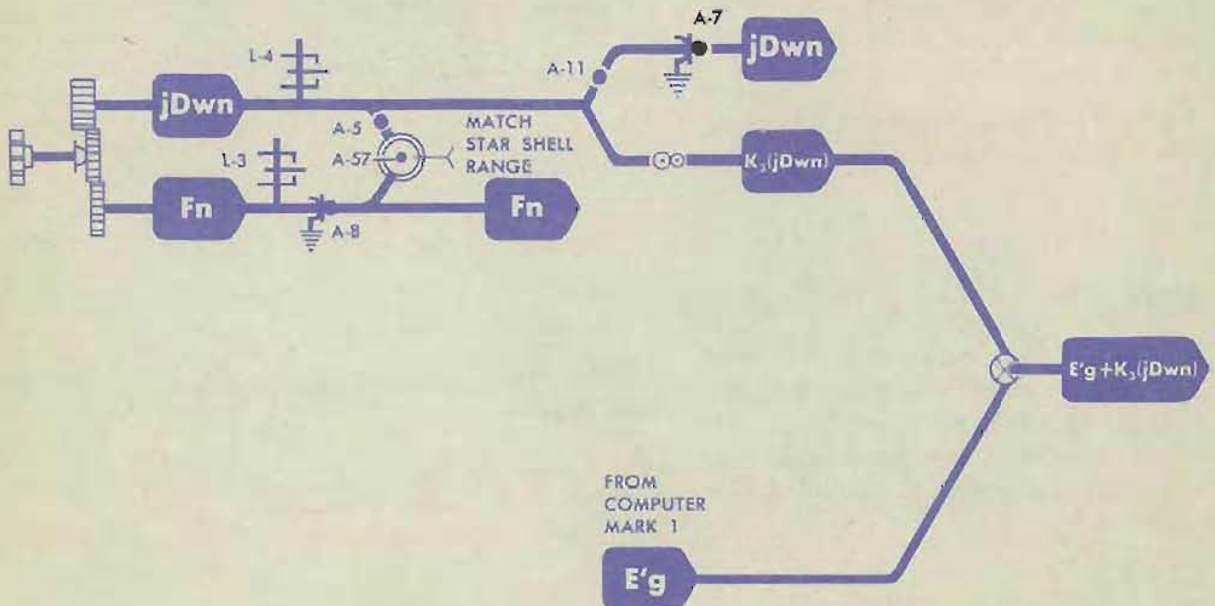
Check

A-7 should hold the *jDwn* setting without too much drag on the line. Increase and decrease *E'g* rapidly. There should be no movement of the *jDwn* range dial.

Adjustment

If *E'g* backs out the *jDwn* line and moves the dial, loosen A-7. Turn the clamp clockwise to increase the friction.

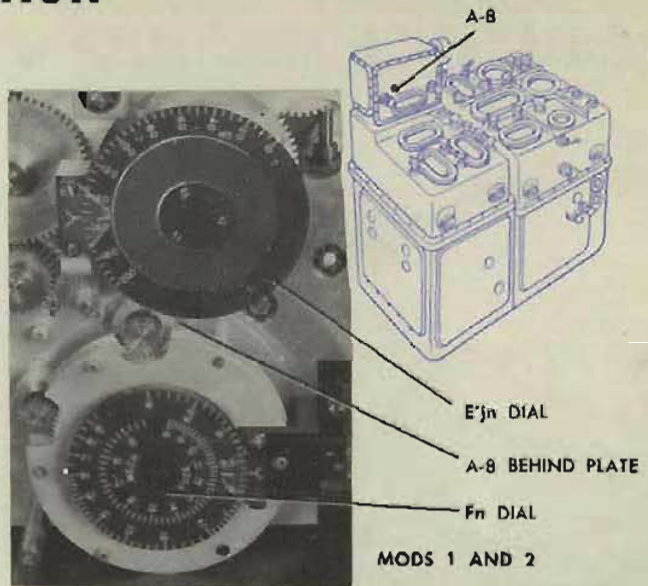
Tighten A-7, and recheck.



A-8 Fn HOLDING FRICTION

Location

A-8 is under the front cover.



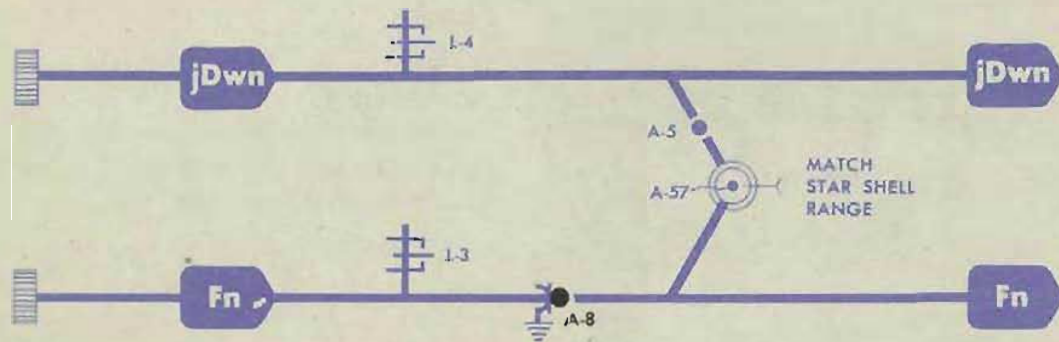
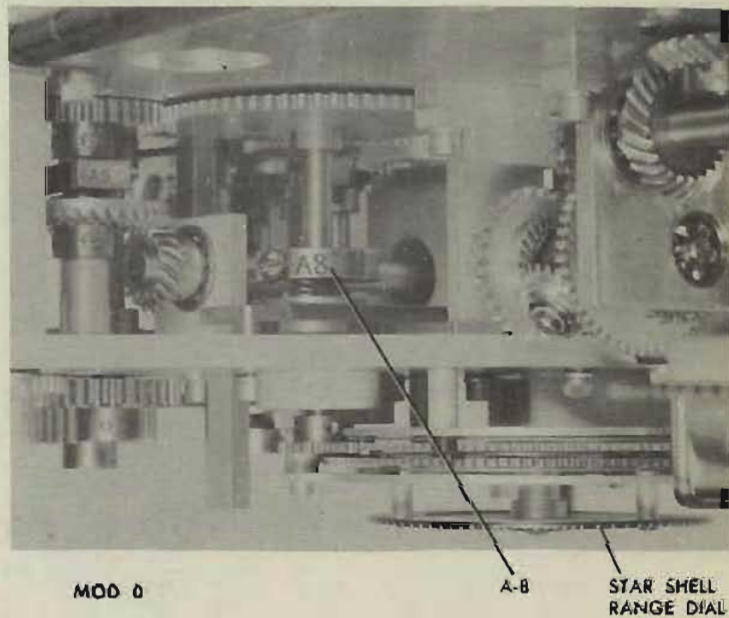
Check

A-8 should hold the *Fn* setting without too much drag on the line.

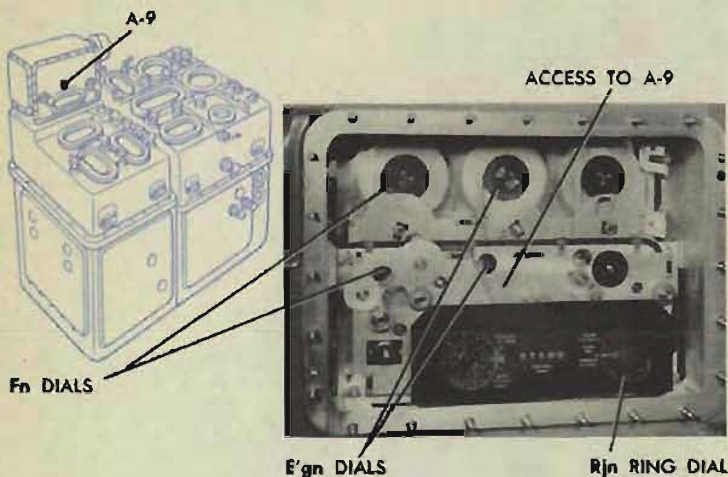
Adjustment

If the *Fn* setting moves off as the transmitters are energized, loosen A-8. Turn the clamp clockwise to increase the friction.

Tighten A-8, and recheck.



A-9 ELEVATION MULTIPLIER to Fn DIALS

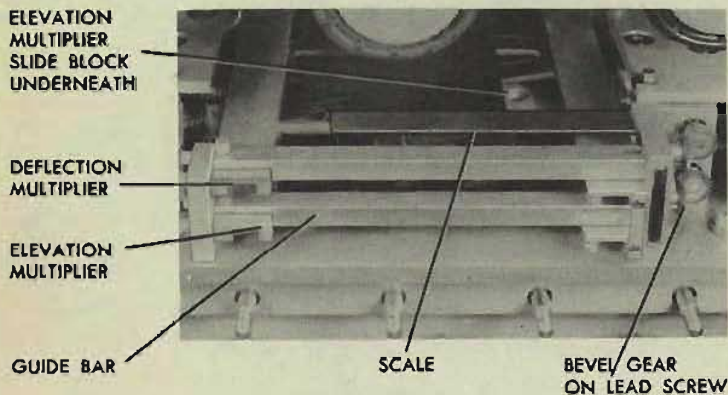


Location

A-9 is under the front cover. On Mods 1 and 2, A-9 is reached through an access hole at the side.

Check

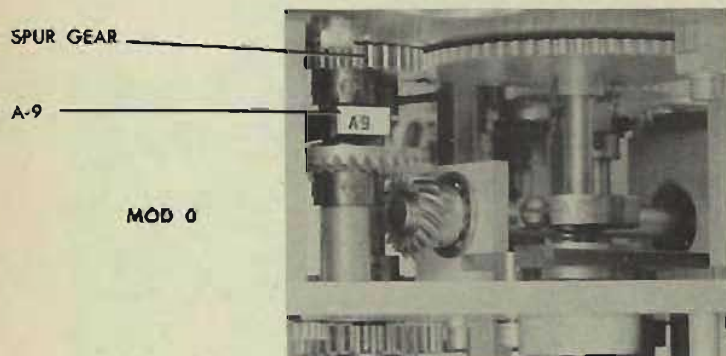
Set *Fn* at 20.85 seconds.
The edge of the elevation multiplier slide block should be exactly 2½ inches from the end of the multiplier.



Adjustment

If the block is not 2½ inches from the end of the multiplier, slip-tighten A-9. Wedge *Fn* at 20.85 seconds. Turn the small bevel gear on the lead screw of the multiplier until the slide block is positioned correctly. Tighten A-9, and recheck. Remove the wedge.

A-9 ALTERNATE METHOD of readjusting



Check

Wedge the *E'g* line from the Computer Mark 1.
Wedge the *jDwn* input line.
On Mods 1 and 2, wedge the *E'jn* line.
Set *Fn* at 35.00 seconds.

Set the *Rjn* ring dial at IN 1400 yards. Read the *E'gn* dials (*E'gjn* dials on Mods 1 and 2).

The input screw of the elevation multiplier should be positioned so that increasing *Rjn* to OUT 1400 yards causes *E'gn* (or *E'gjn*) to increase 393.4' on Mods 0 and 1, or 315.5' on Mod 2.

Adjustment

If *E'gn* (or *E'gjn*) does not increase the correct amount, slip-tighten A-9. Turn the spur gear at the rear of A-9 until the change in *E'gn* (or *E'gjn*) is correct.

Tighten A-9, and recheck.

Remove the wedges from the *E'g*, *E'jn*, and *jDwn* lines.

Check A-231 in Computer Mark 1.

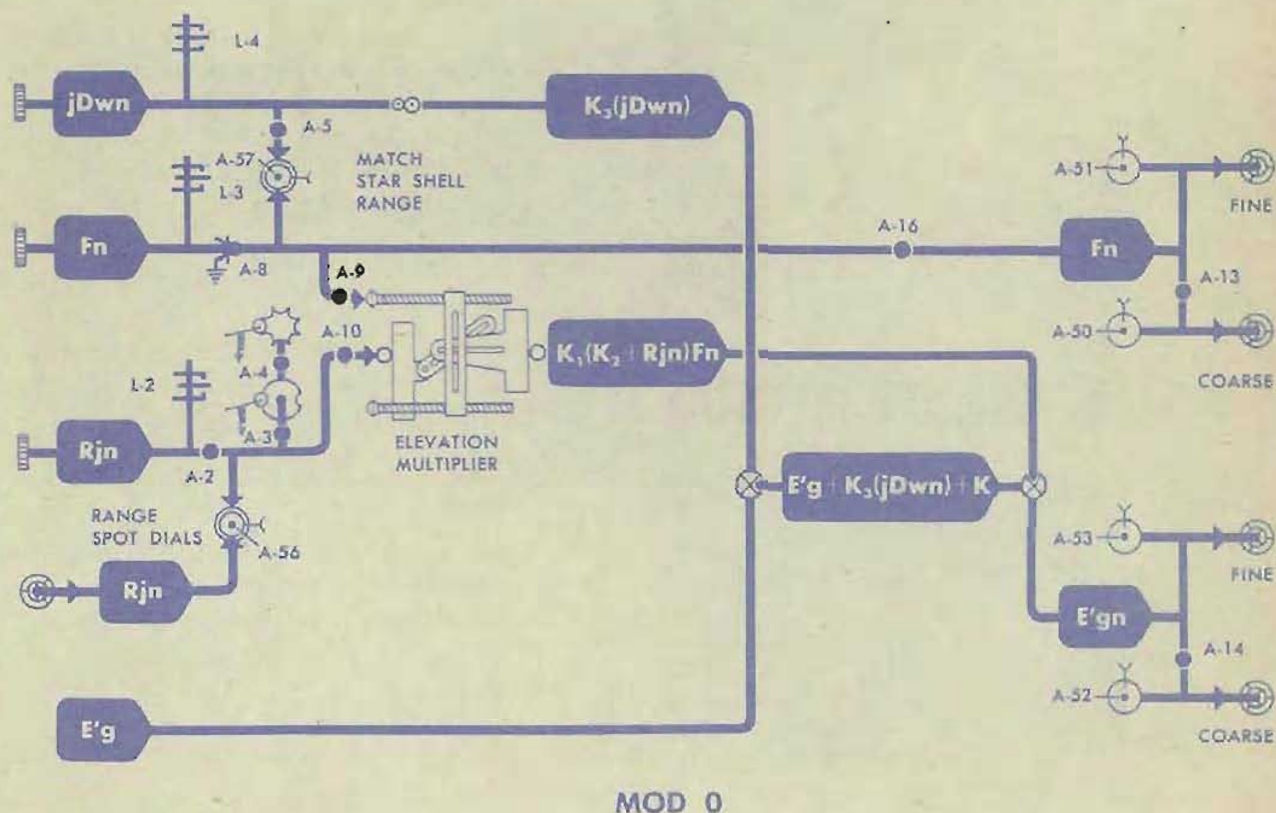


MODS 1 AND 2

A-9

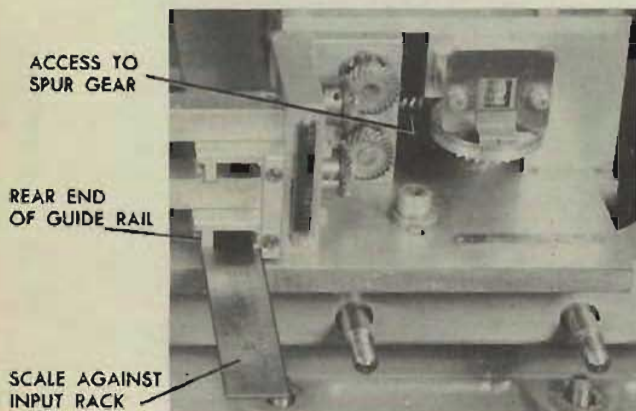
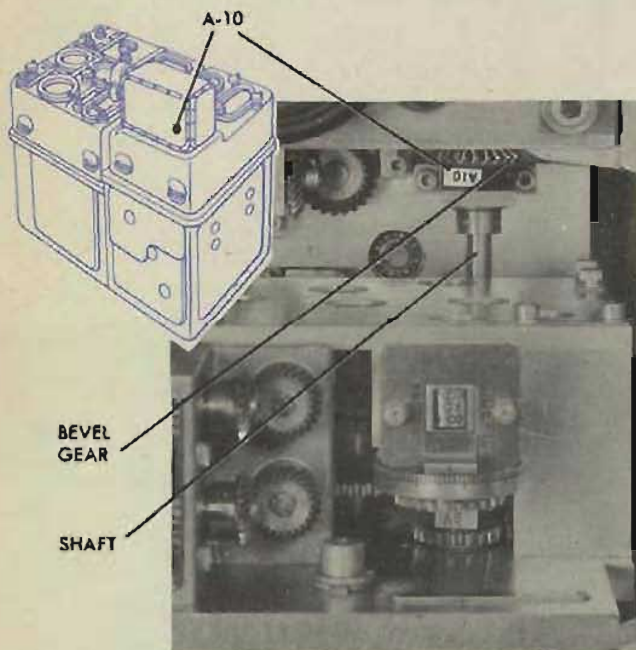


ACCESS TO A-9
5 INCHES
IN AND UP AT 45°



MOD 0

A-10 ELEVATION MULTIPLIER to Rjn RING DIAL



Location

A-10 is under the back cover, above and in front of the star shell deflection counter.

Check

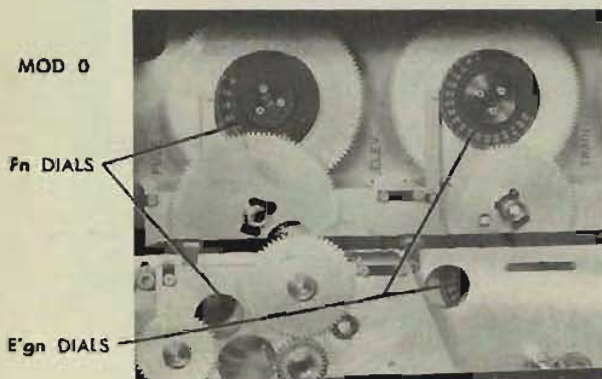
Set the *Rjn* dial at IN 200 yards. The multiplier input rack should be exactly 2½ inches from the rear end of the guide rail.

Adjustment

If the rack is not exactly 2½ inches from the end of the guide rail, slip-tighten A-10.

Wedge the *Rjn* line at IN 200 yards. Turn the spur gear which meshes with the input rack until the rack is 2½ inches from the end of the guide rail. Tighten A-10, and recheck. Remove the wedge.

A-10 ALTERNATE METHOD of readjusting



Check

Wedge the *E'g* line from the Computer Mark 1.

On Mods 1 and 2, wedge the *E'jn* line. Wedge the *jDwn* input line.

Set the *Rjn* ring dial at OUT 1,000 yards. Use the *Rjn* input gear.

Set *Fn* at 10.00 seconds. Use the *Fn* input gear.

Read the $E'gn$ dials ($E'gjn$ dials on Mods 1 and 2). Increase F_n to 30.00 seconds.

The $E'gn$ (or $E'gjn$) dial reading should have increased 309.6' on Mods 0 and 1, or 203.3' on Mod 2.

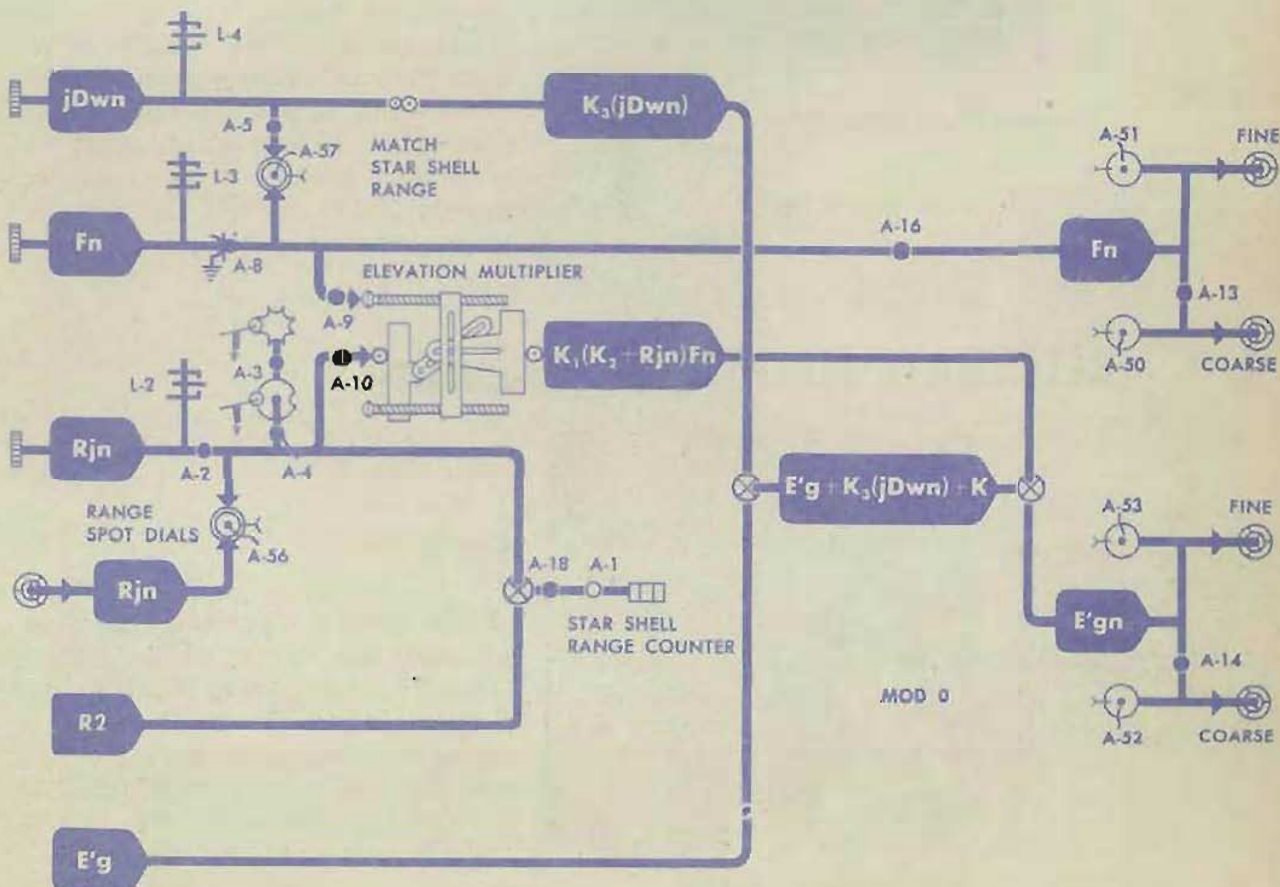
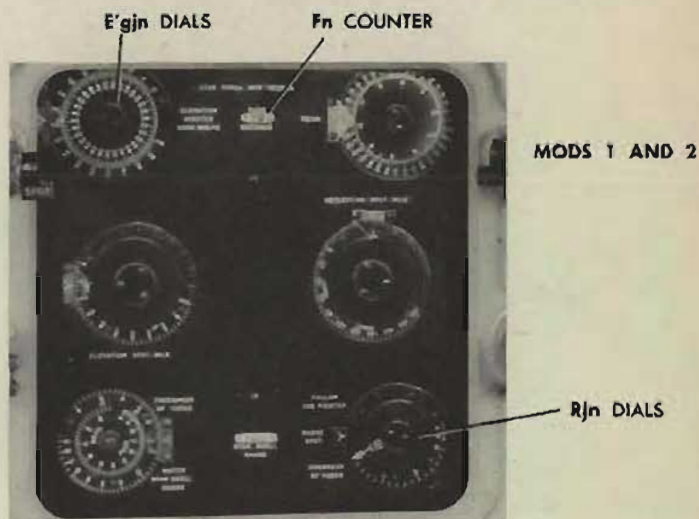
Adjustment

If $E'gn$ (or $E'gjn$) does not increase the proper amount, slip-tighten A-10. Hold the bevel gear and turn the shaft below A-10 until the change in $E'gn$ (or $E'gjn$) is correct.

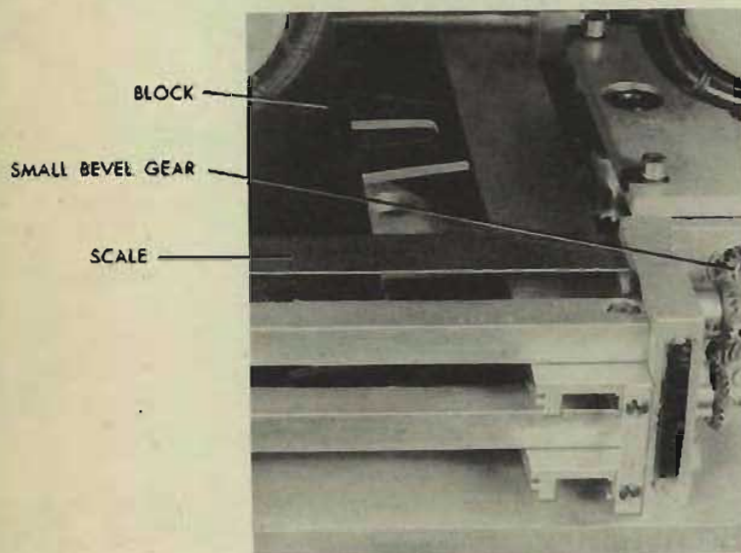
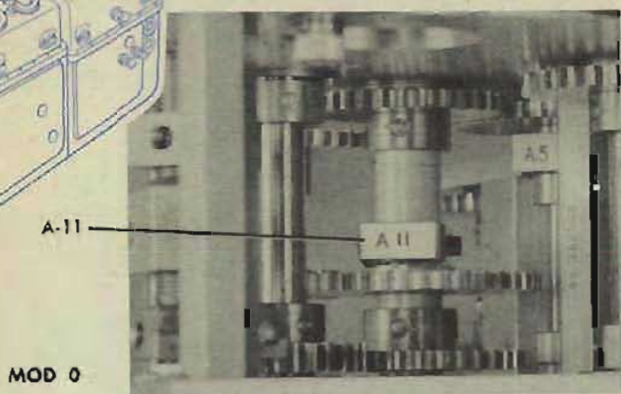
Tighten A-10, and recheck.

Remove the wedges on the $E'g$, $E'jn$, and $jDwn$ lines.

Check A-231 in Computer Mark 1.



A-11 DEFLECTION MULTIPLIER to *jDwn* LINE



Location

A-11 is under the front cover, on the *jDwn* line. On Mods 1 and 2, A-11 can be reached through an access hole under the junction box cover.

Check

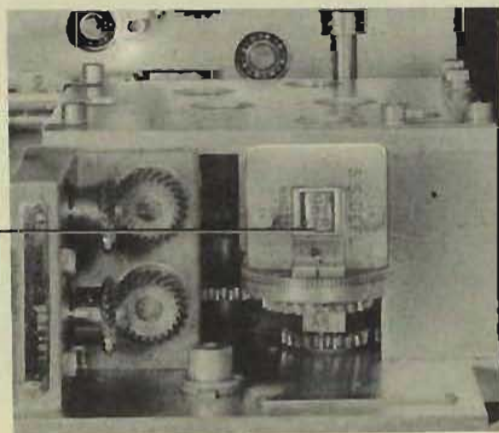
Set the *jDwn* ring dial at 8,000 yards. On Mods 0 and 1, the slide block on the deflection multiplier should be exactly 2½ inches from the end of the multiplier. On Mod 2, it should be ½ inch from the end of the multiplier.

Adjustment

If the block is not correctly positioned in relation to the end of the guide rail, slip-tighten A-11.

Wedge the *jDwn* line at 8,000 yards. Turn the small bevel gear on the lead-screw input of the deflection multiplier until the block is the correct distance from the end of the multiplier. Tighten A-11, and recheck. Remove the wedge. Check A-17.

A-11 ALTERNATE METHOD of readjusting

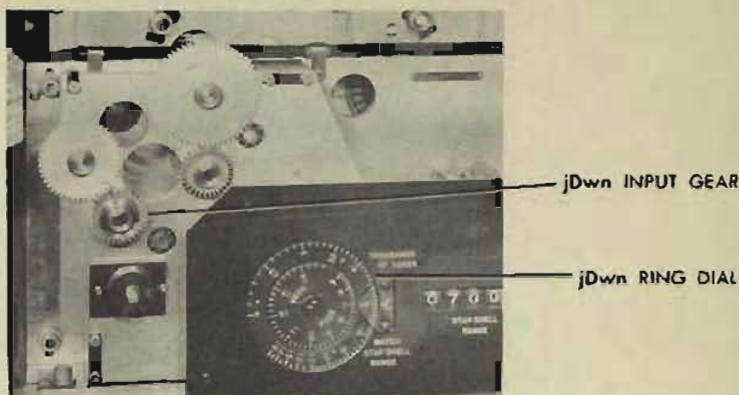


Check

Wedge the *B'gr* input line from Computer Mark 1. On Mods 1 and 2, wedge the *B'jn* line. Set star shell deflection at 0 knots. On Mods 0 and 1, set the *jDwn* ring dial at 5,000 yards; on Mod 2, at 8,000 yards. Read the *B'grn* dials (*B'grjn* dials on Mods 1 and 2).

Increase star shell deflection to 50.0 knots.

The reading on the *B'grn* (or *B'grjn*) dials should have increased $9^{\circ}41'$ on Mods 0 and 1, or $6^{\circ}03'$ on Mod 2.



Adjustment

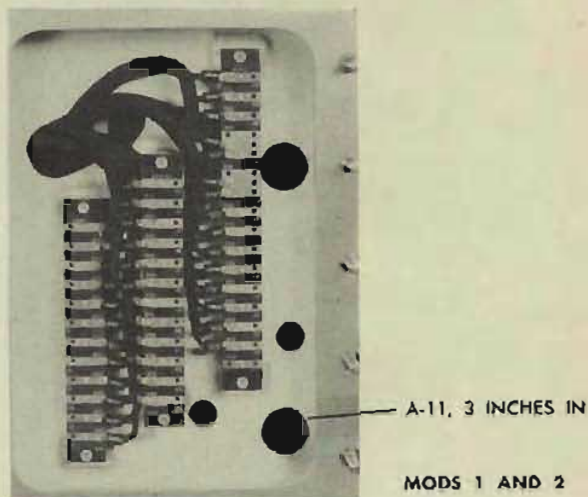
If the *B'grn* (or *B'grjn*) dials do not show the correct increase, slip-tighten A-11.

Turn the spur gear at the rear of A-11 until the change in *B'grn* (or *B'grjn*) is correct.

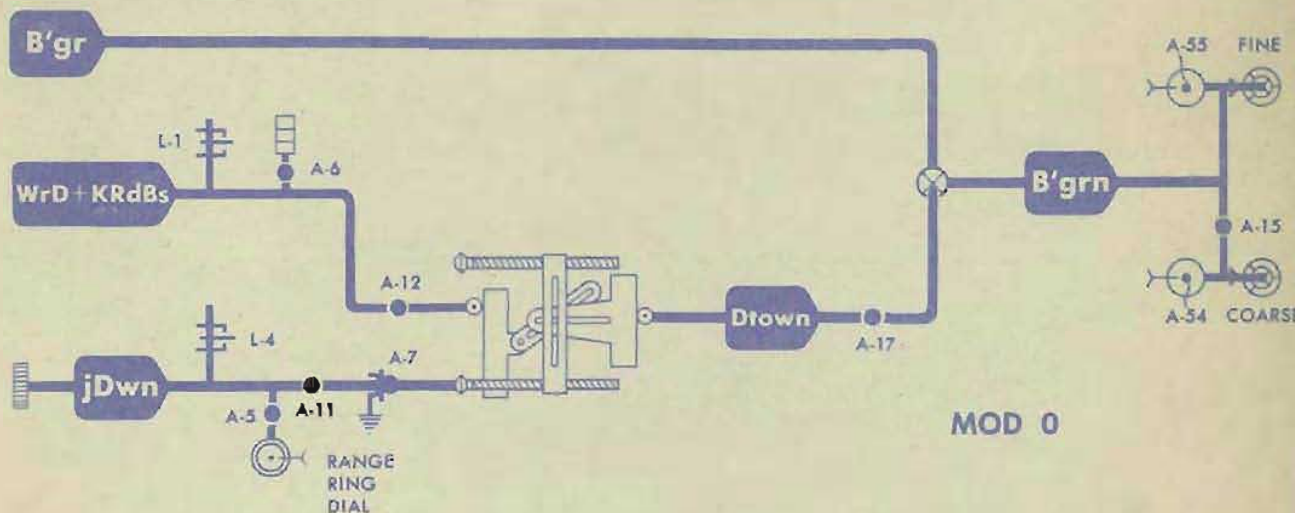
Tighten A-11, and recheck.

Remove the wedges.

Check A-17.

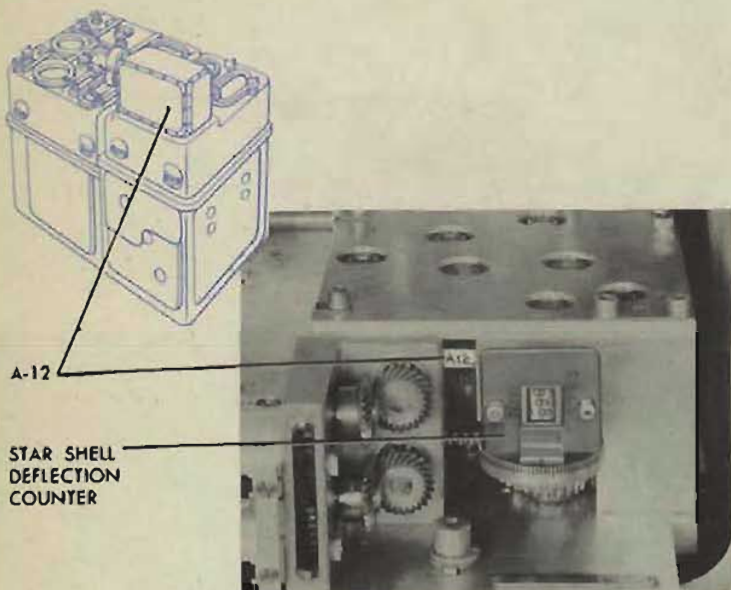


MODS 1 AND 2



MOD 0

A-12 DEFLECTION MULTIPLIER to STAR SHELL DEFLECTION COUNTER



Location

A-12 is under the rear cover.

Check

Turn the power OFF.

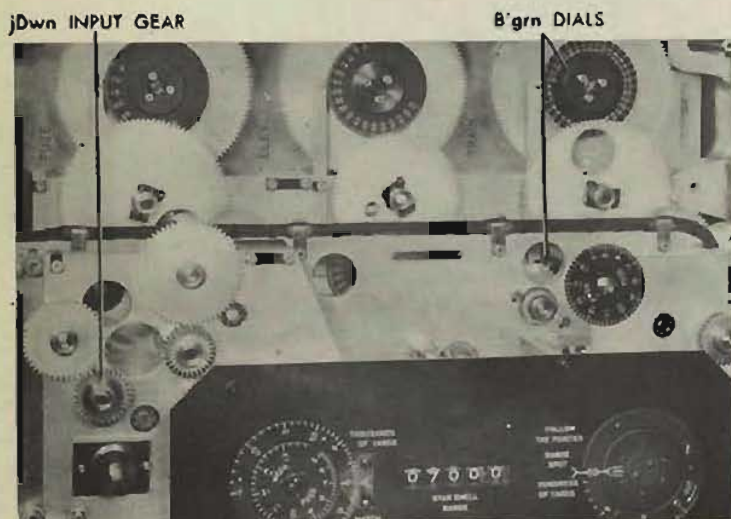
Set the star shell deflection counter at 0 by turning the gearing.

The *WrD + KRdBs* input slide to the deflection multiplier should be positioned so that turning the *jDwn* input gear produces no motion of the output slide.

Wedge the *B'gr* line from Computer Mark 1.

On Mods 1 and 2, wedge the *B'jn* line. Turn the *jDwn* input gear.

The *B'grn* (*B'grjn* on Mods 1 and 2) dial reading should not change.



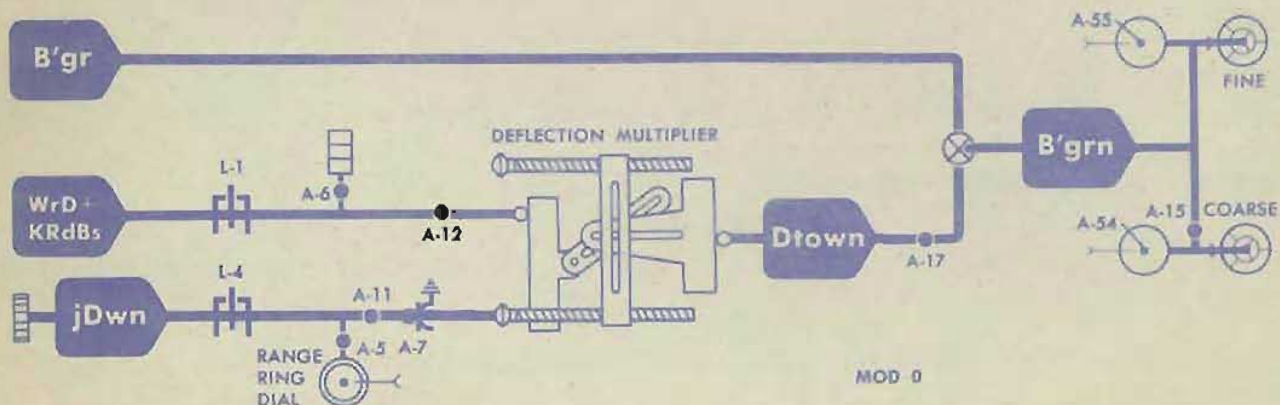
Adjustment

If the *B'grn* (or *B'grjn*) reading changes, slip-tighten A-12. Turn the spur gear at A-12 until there is no change in the *B'grn* (or *B'grjn*) dial reading when the *jDwn* input gear is turned through its full travel.

Tighten A-12, and recheck.

Remove the wedges.

Check A-17.



A-13 FINE to COARSE SYNCHRO— Fn TRANSMITTER

Location

A-13 is under the front cover, in front of the star shell fuze order transmitters.

Check

Put the coarse fuze synchro on electrical zero. At that position, on Mod 0 the coarse dial reads 10; on Mods 1 and 2 the scribe mark is at the fixed index.

The fine synchro should also be on electrical zero.

On Mod 0 the fine dial should read 0.0; on Mods 1 and 2 the scribe mark should be at the fixed index.

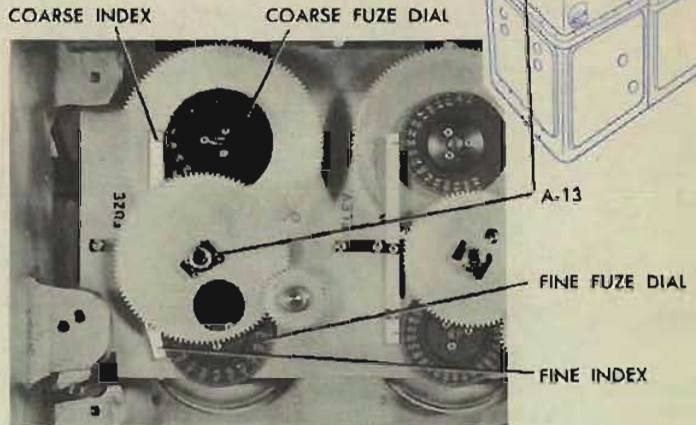
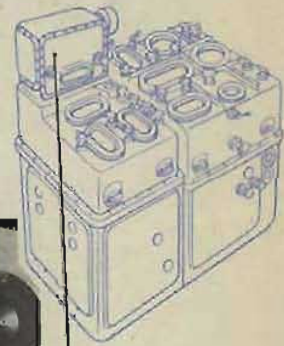
Adjustment

If the fine fuze synchro is not on electrical zero when the coarse synchro is on electrical zero, slip-tighten A-13. Hold the fine synchro on electrical zero, and turn the large spur gear on the coarse synchro until the coarse synchro is also on electrical zero.

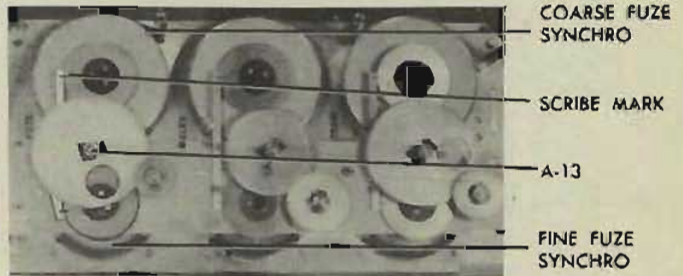
Tighten A-13, and recheck. Check A-16.

Note

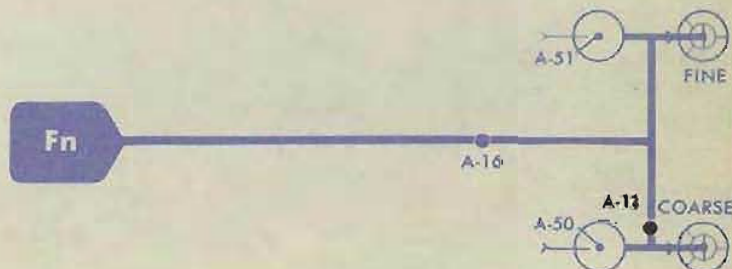
On Mod 0, the fine dial has two graduations marked 0.0 seconds. Use the same graduation in readjusting A-13 that was used for readjusting A-51.



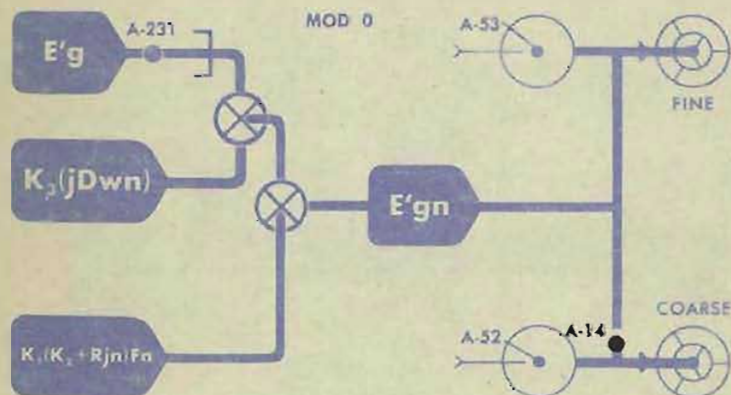
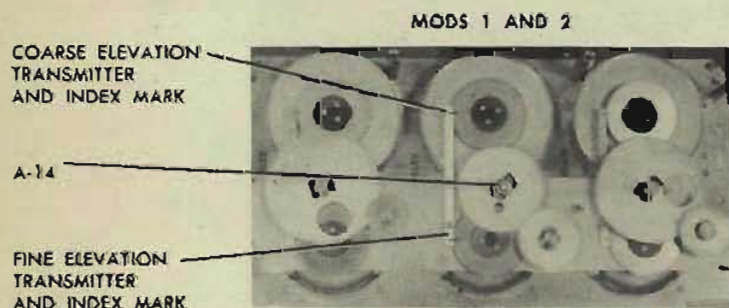
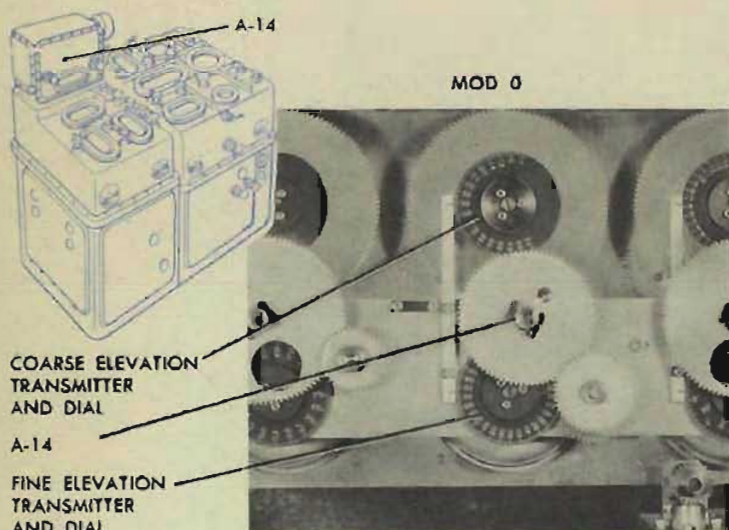
MOD 0



MODS 1 AND 2



A-14 FINE to COARSE SYNCHRO— E'gn TRANSMITTER



Location

A-14 is under the front cover, in front of the E'gn transmitters (E'gn on Mods 1 and 2).

Check

Put the coarse E'gn (or E'gn) synchro on electrical zero. At that position, on Mod 0 the coarse dial reads 20; on Mods 1 and 2 the scribe mark is at the fixed index.

The fine synchro should also be on electrical zero. On Mod 0, the fine dial should read 00; on Mods 1 and 2 the fine scribe mark should be at the fixed index.

Adjustment

If the fine synchro is not on electrical zero when the coarse synchro is on electrical zero, slip-tighten A-14. Hold the fine synchro on electrical zero. Turn the large spur gear on the coarse synchro until the coarse synchro is also on electrical zero.

Tighten A-14, and recheck. Check A-231.

Note

On Mod 0, there are six graduations marked 00 on the fine dial. In readjusting A-14, use the same graduation that was used for readjusting A-53.

A-15 FINE to COARSE SYNCHRO— B'grn TRANSMITTER

Location

A-15 is under the front cover, in front of the B'grn transmitters (B'grjn on Mods 1 and 2).

Check

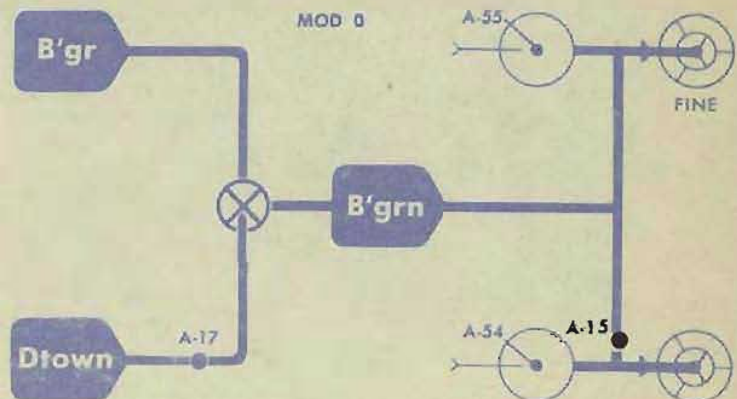
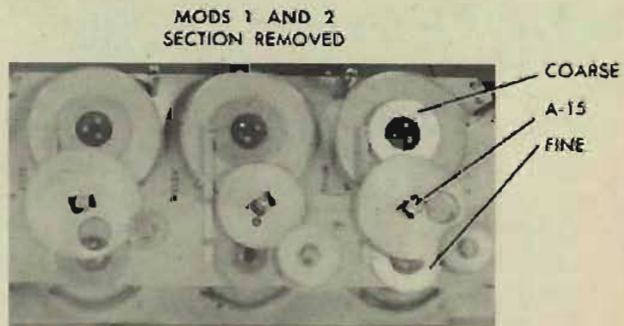
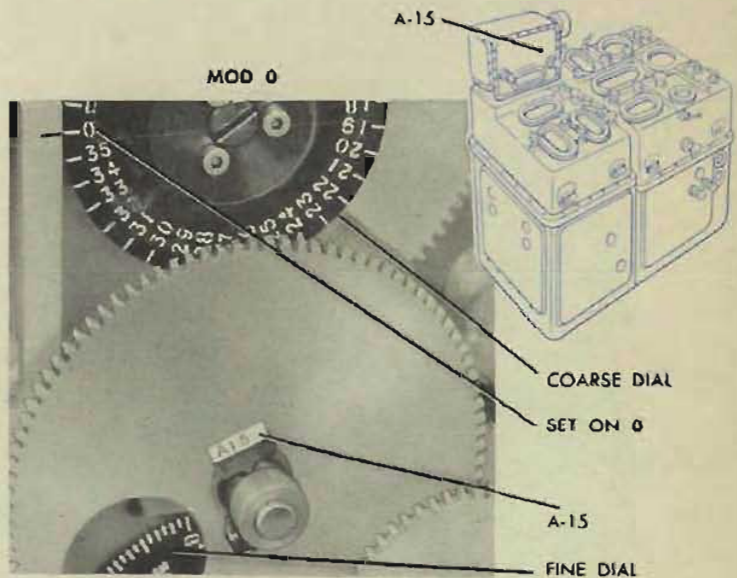
Put the coarse B'grn (or B'grjn) synchro on electrical zero. At that position, on Mod 0 the coarse dial reads 0; on Mods 1 and 2 the scribe mark is at the fixed index.

The fine synchro also should be on electrical zero. On Mod 0 the fine dial should read 0; on Mods 1 and 2 the scribe mark should be at the fixed index.

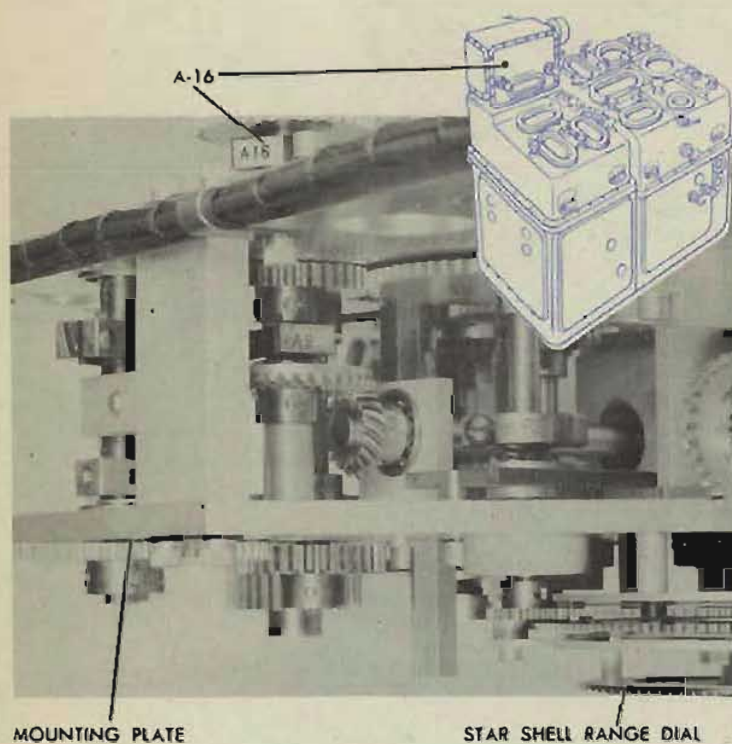
Adjustment

If the fine synchro is not on electrical zero when the coarse synchro is on electrical zero, slip-tighten A-15. Hold the fine synchro on electrical zero and turn the large spur gear on the coarse synchro until the coarse synchro is on electrical zero.

Tighten A-15, and recheck.
Check A-17.



A-16 MOD 0 Fn DIALS to L-3



Location

A-16 is under the front cover, in back of the mounting plate behind the dial mask.

Check

L-3 should operate at 8.20 and 41.55 seconds.

Turn the *Fn* input gear to the lower limit of the stop.

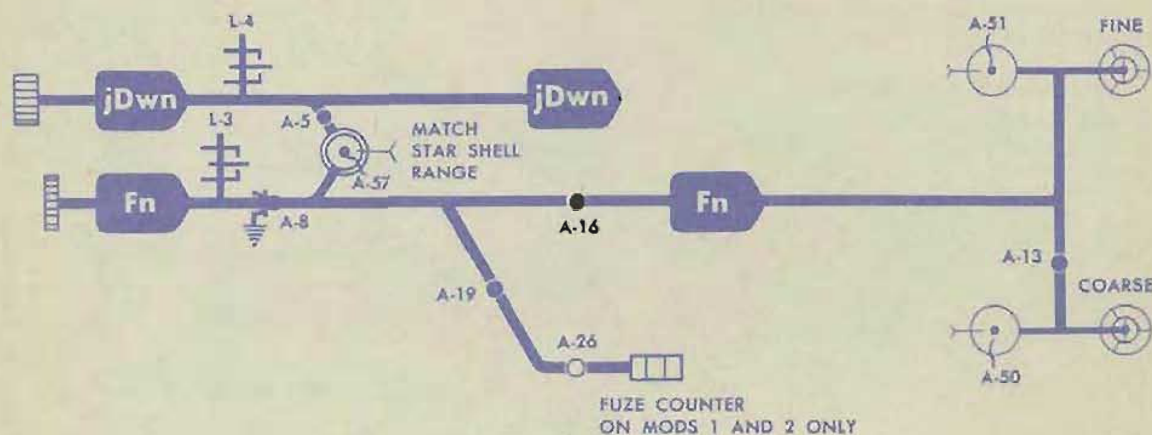
The *Fn* dials should read 8.20 seconds.

Adjustment

If the *Fn* dials do not read 8.20 seconds, loosen A-16.

Hold the *Fn* line against the stop, and turn the large spur gear above A-16 until the dial reading is correct.

Tighten A-16, and check at the upper limit.



A-16 MODS 1 and 2 F_n TRANSMITTER to F_n COUNTER

Location

A-16 is under the front cover and is accessible through a hole under the junction box cover.

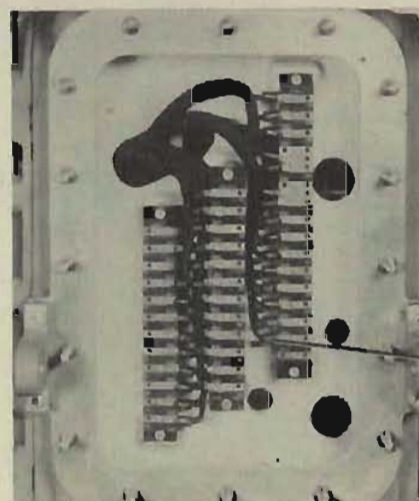
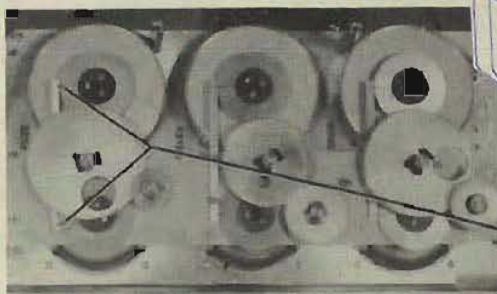
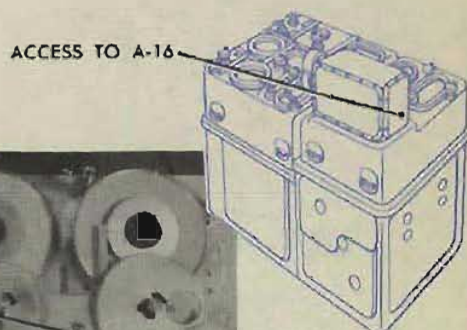
Check

Set the *F_n* counter at 10.00 seconds. The *F_n* transmitter scribe marks should be at the fixed indexes.

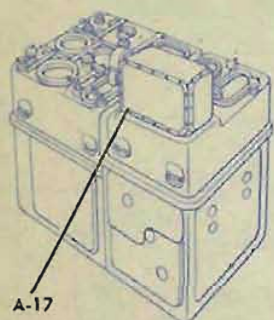
Adjustment

If the *F_n* transmitter scribe marks are not at the fixed indexes, loosen A-16. Hold the counter at 10.00 seconds. Turn the gear on which A-16 is mounted until the transmitter scribe marks are at the index marks.

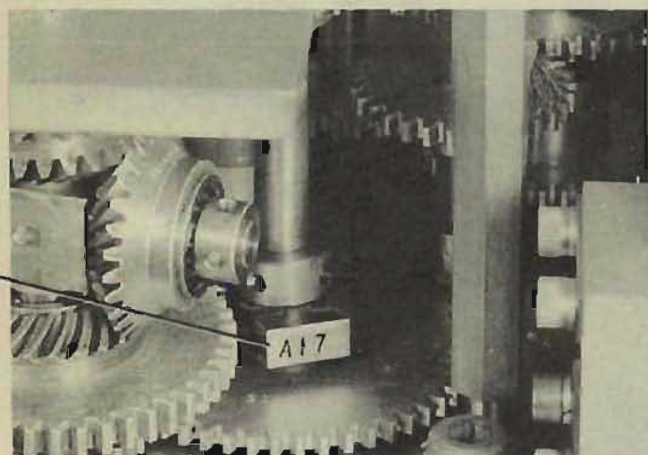
Tighten A-16, and recheck.
Check A-19.



A-17 B'grn DIALS to B'gr DIALS



A-17



A-17

Location

A-17 is under the rear cover, just above the base plate.

Note

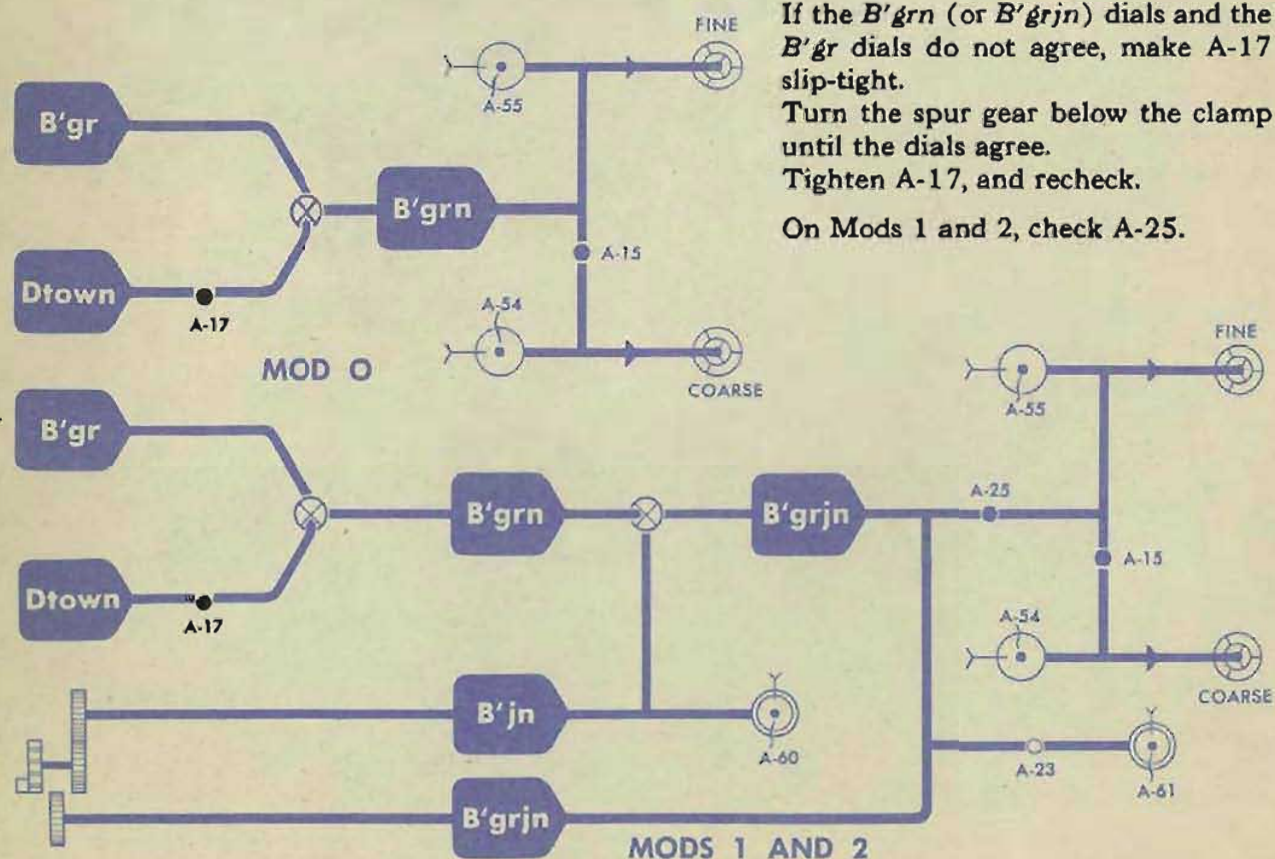
On Mods 1 and 2, check A-23 before readjusting A-17.

Check

Turn the power OFF.
 Set the star shell deflection counter at 0 knots by turning the gearing. On Mods 1 and 2 also set the B'jn dials at 0.
 The B'grn dials (or B'grjn dials on Mods 1 and 2) should match the B'gr dials.

Adjustment

If the B'grn (or B'grjn) dials and the B'gr dials do not agree, make A-17 slip-tight.
 Turn the spur gear below the clamp until the dials agree.
 Tighten A-17, and recheck.
 On Mods 1 and 2, check A-25.



A-18 R2n COUNTER to R2 COUNTER

Location

A-18 is under the front cover, on a spur gear next to the star shell range counter.

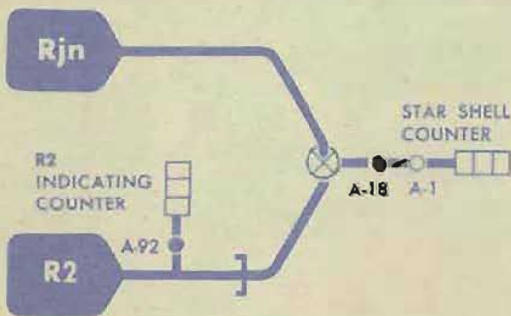
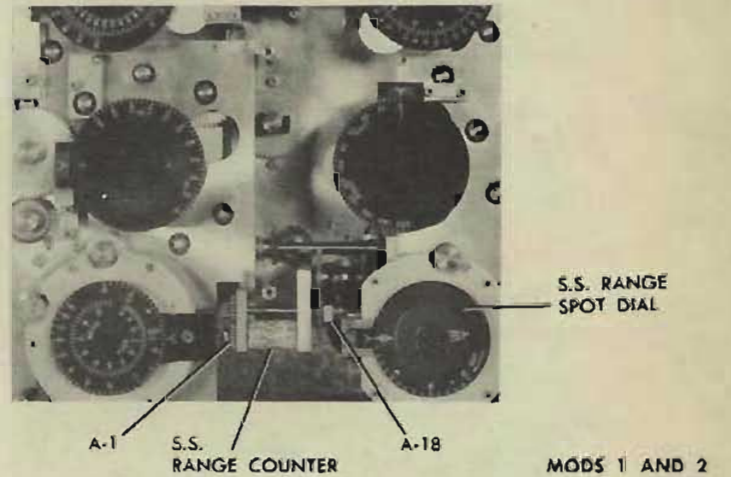
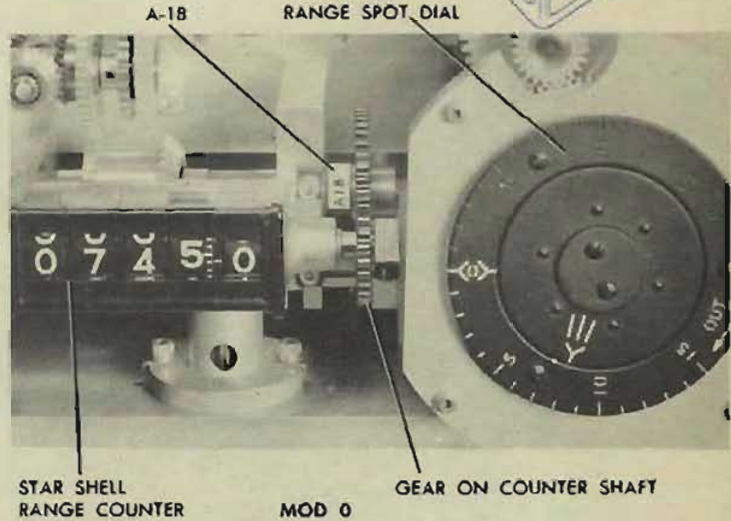
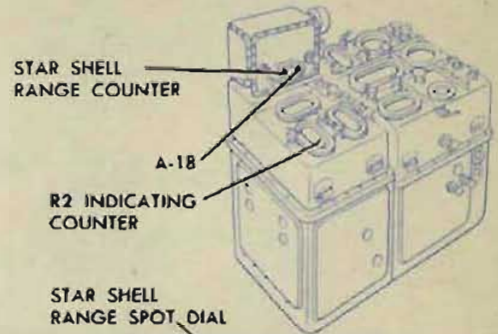
Check

Set R_{jn} at 0.
 The R_{2n} counter should read 1,000 yards more than the R_2 counter in the Computer Mark 1.

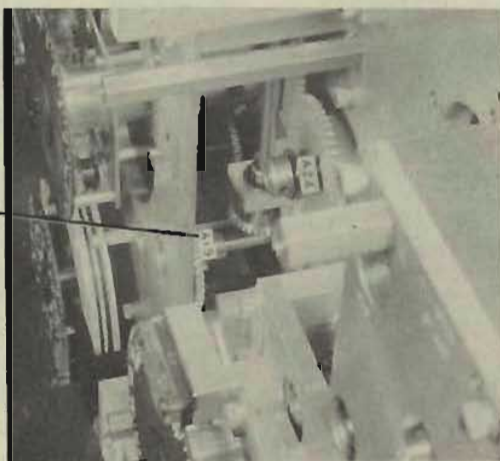
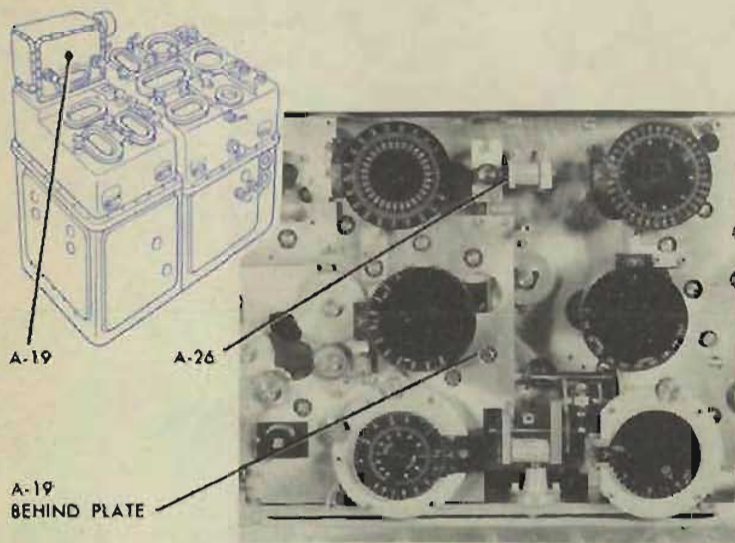
Adjustment

If the R_{2n} counter does not read 1,000 yards more than the R_2 counter, loosen A-18. Turn the gear on the counter shaft until the reading is correct.

Tighten A-18, and recheck.
 Check that assembly clamp A-1 is tight.



A-19 Fn COUNTER to L-3



Location

A-19 is under the front cover, behind the plate to the right of the elevation spot dial.

Check

Decrease *Fn* to the lower limit. On Mod 1 the *Fn* counter should read 8.20 seconds; on Mod 2, 9.70 seconds.

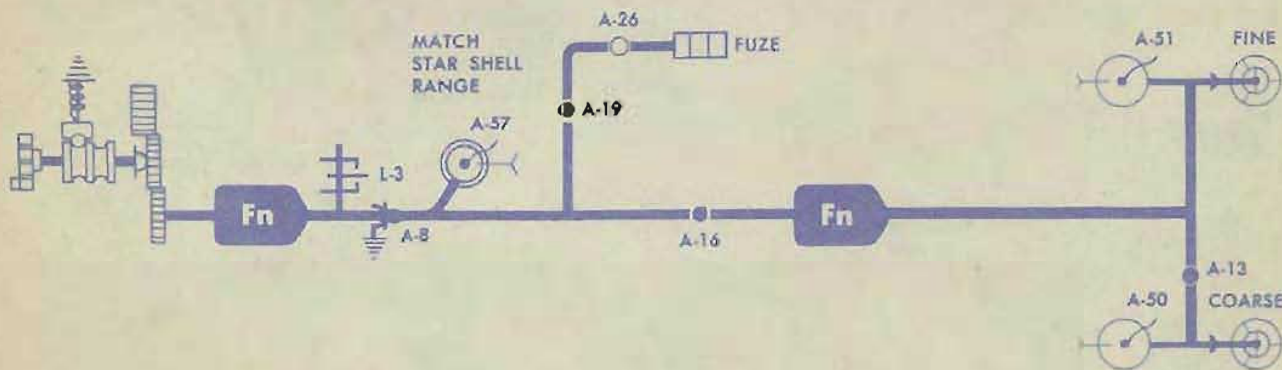
Increase *Fn* to the upper limit. On Mod 1, the *Fn* counter should read 41.55 seconds; on Mod 2, 46.70 seconds.

Check that A-26 is tight, before re-adjusting A-19.

Adjustment

If the *Fn* counter reading is incorrect at either limit, loosen A-19. Hold the line against the stop and set the counter at the proper reading.

Tighten A-19, and recheck. Split any overtravel. Check A-16 and A-57.



A-22 ASSEMBLY CLAMP

Location

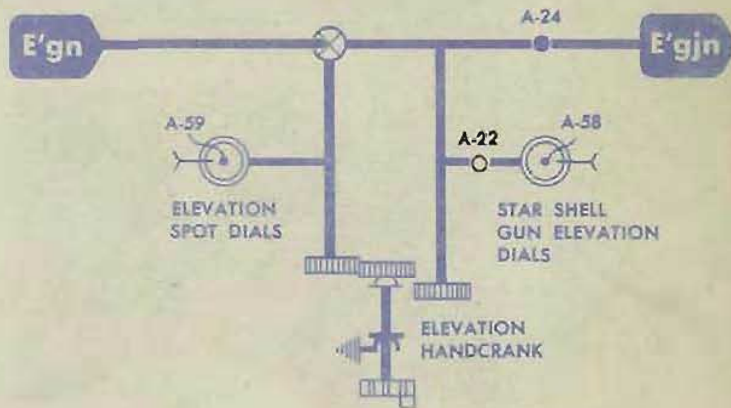
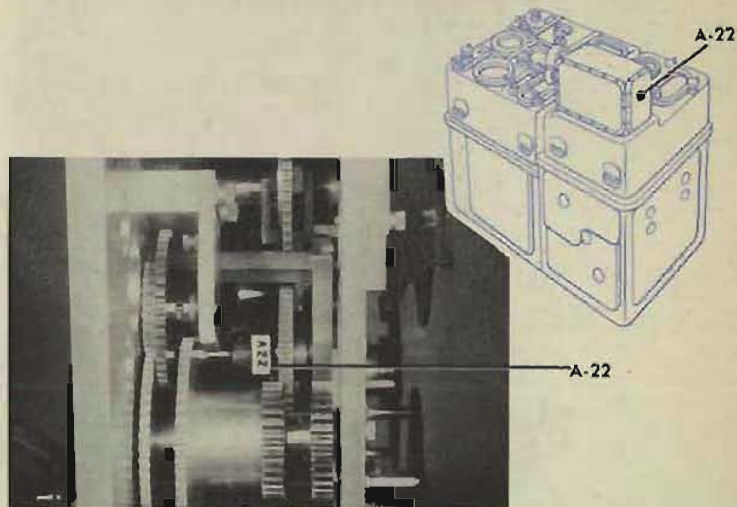
A-22 is under the front cover, behind the plate supporting the *E'gjn* dials. It is accessible through a hole under the junction box cover.

Check

A-22 should be tight.

Adjustment

Tighten A-22.
Check A-24 and A-231.



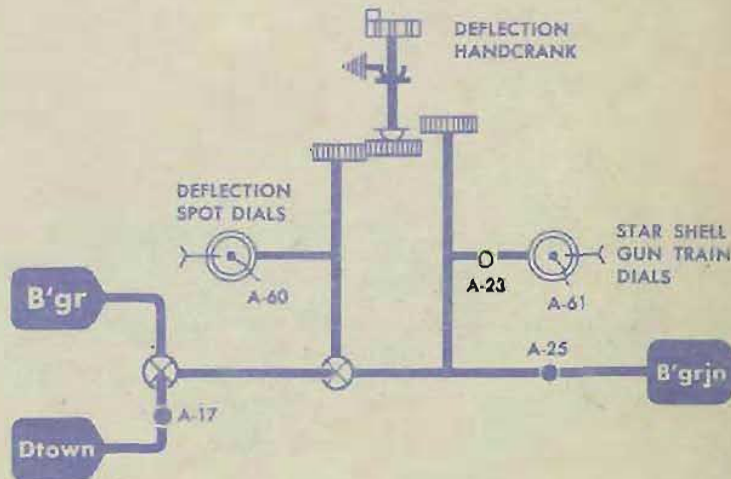
A-23 ASSEMBLY CLAMP

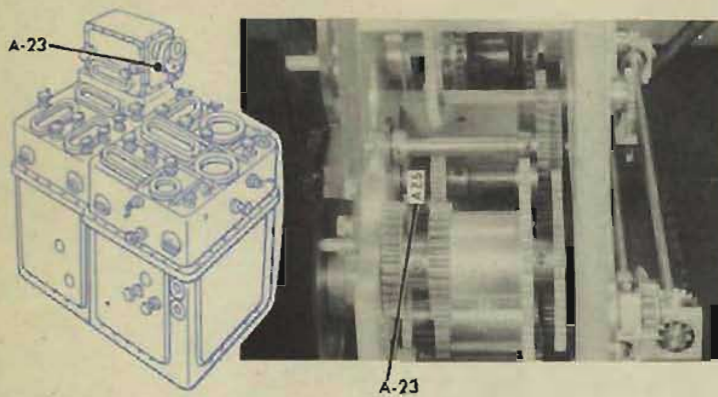
Location

A-23 is under the front cover, behind the plate supporting the *B'grjn* dials. It is accessible through a hole on the right side.

Check

A-23 should be tight.

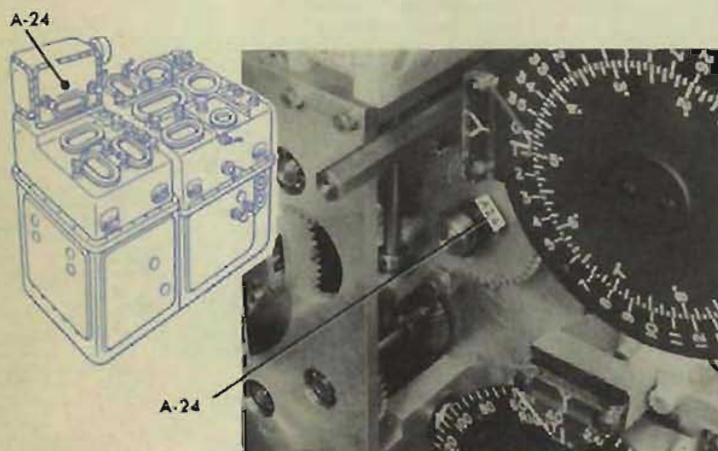




Adjustment

Tighten A-23.
Check A-25 and A-17.

A-24 E'gjn TRANSMITTER to E'gjn DIALS



Location

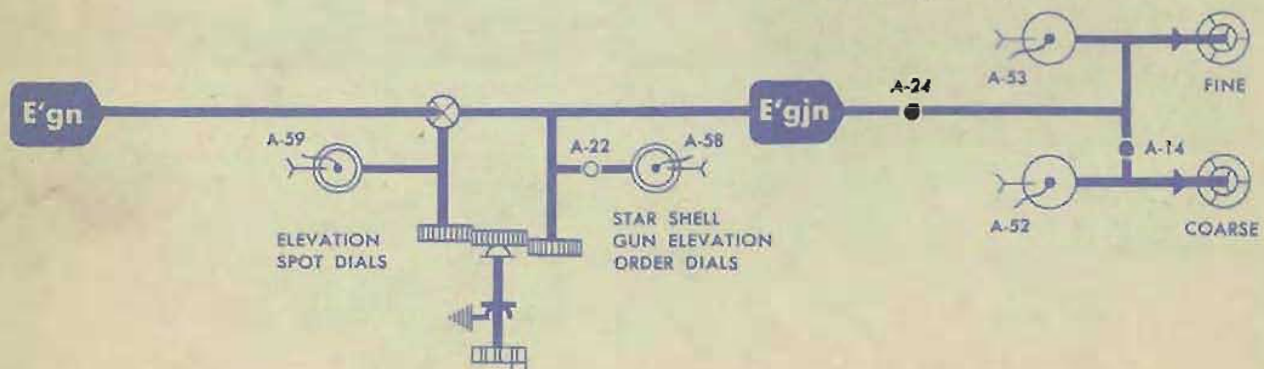
A-24 is under the front cover, below the *F_n* counter.

Check

Set the *E'gjn* dials at 2000'.
The scribe marks on the fine and coarse transmitter dials should match the fixed indexes.
Check that A-22 is tight, before re-adjusting A-24.

Adjustment

If the scribe marks do not match the fixed indexes, loosen A-24.
Turn the transmitter gearing to align the scribe marks at the fixed indexes.
Tighten A-24, and recheck.
Check A-52, A-53, and A-14.



A-25 B'grjn TRANSMITTER to B'grjn DIALS

Location

A-25 is accessible through a hole at the right side.

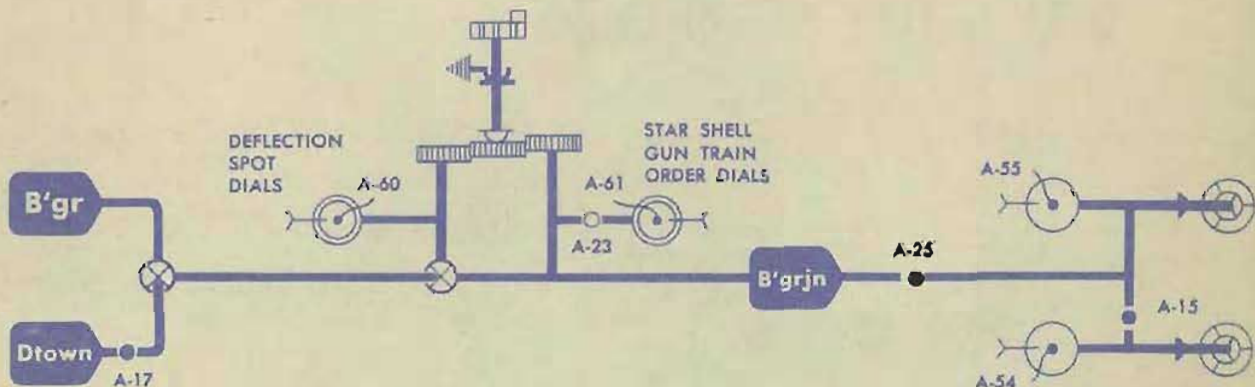
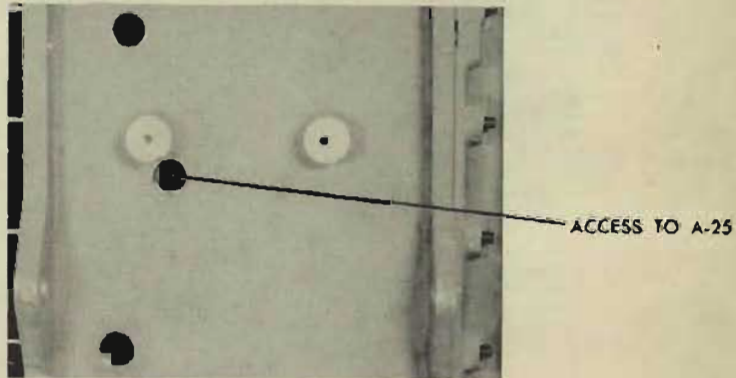
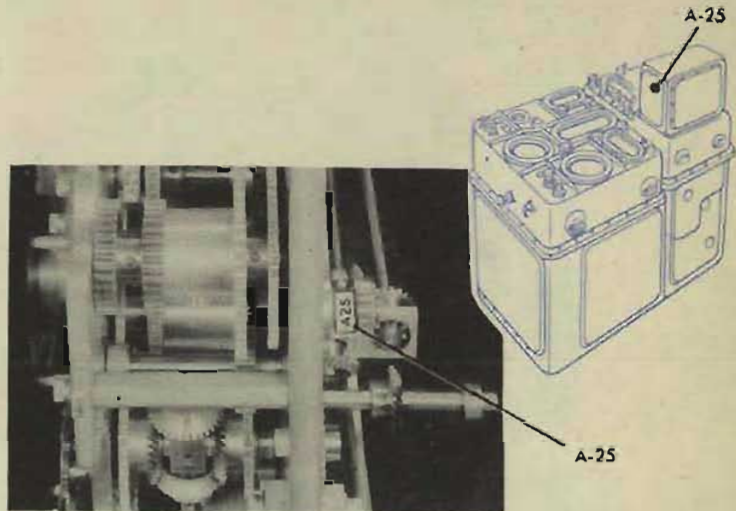
Check

Set the *B'grjn* dials at 0° .
The scribe marks on the fine and coarse transmitter dials should match the fixed indexes.
Check that A-23 is tight before re-adjusting A-25.

Adjustment

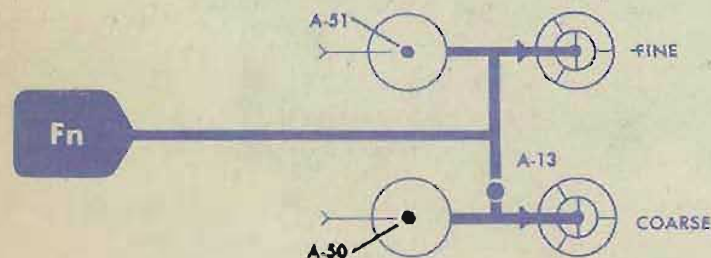
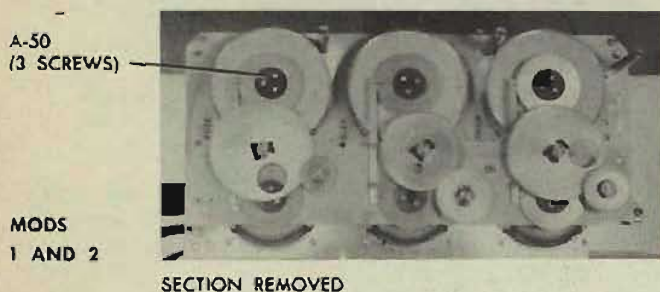
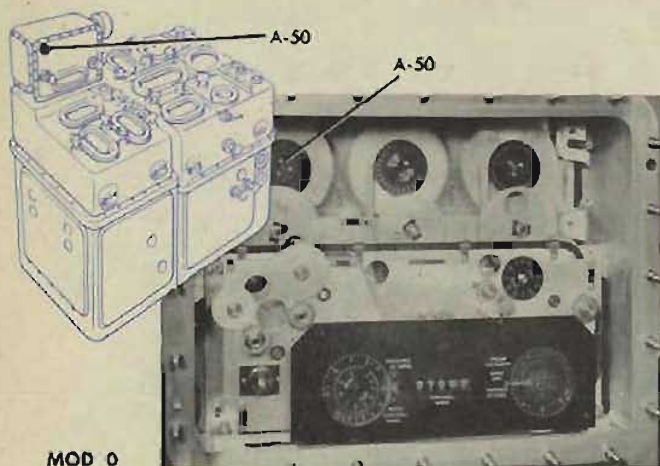
If the scribe marks do not match the fixed indexes, loosen A-25. Turn the transmitter gearing to align the scribe marks at the fixed indexes.

Tighten A-25, and recheck.
Check A-54, A-55, and A-15.

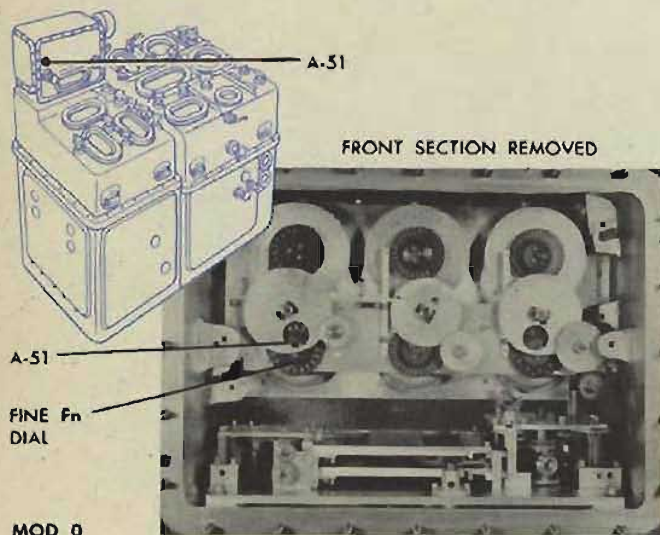


A-26 ASSEMBLY CLAMP (see A-19)

A-50 DIAL to COARSE Fn SYNCHRO



A-51 DIAL to FINE Fn SYNCHRO



Location

A-50 is under the front cover, on the coarse *Fn* transmitter dial. On Mods 1 and 2, A-50 is accessible only after the transmitter section is removed from the star shell computer.

Check

Set the coarse *Fn* synchro at electrical zero. On Mod 0, the coarse *Fn* dial should read 10 seconds. On Mods 1 and 2, the scribe mark should be at the fixed index.

Adjustment

If the coarse *Fn* dial does not read 10 seconds, or the scribe mark is not at the fixed index, loosen A-50. Slip the dial to the correct position.

Tighten A-50 and recheck. Check A-13 and A-16.

Location

A-51 is under the front cover, on the fine *Fn* transmitter dial.

Check

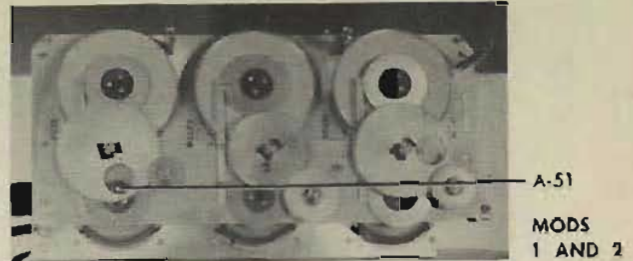
Set the fine *Fn* synchro at electrical zero. On Mod 0, the fine *Fn* dial should read 0.00 seconds. On Mods 1 and 2, the scribe mark should be at the fixed index.

Adjustment

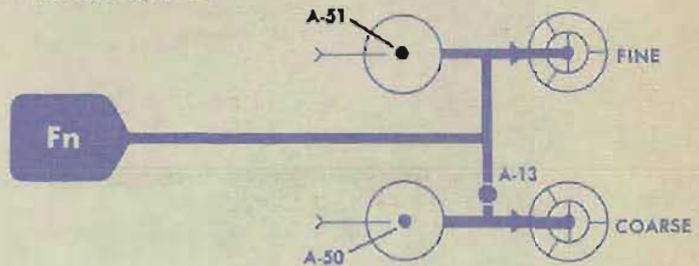
If the fine *F_n* dial does not read 0.00, or the scribe mark is not at the fixed index, loosen A-51. Slip the dial to the correct position.

Tighten A-51 and recheck.

Check A-13 and A-16.



SECTION REMOVED



A-52 DIAL to COARSE E'gjn SYNCHRO

Location

A-52 is under the front cover, on the coarse *E'gjn* transmitter.

Check

Set the coarse *E'gjn* synchro at electrical zero.

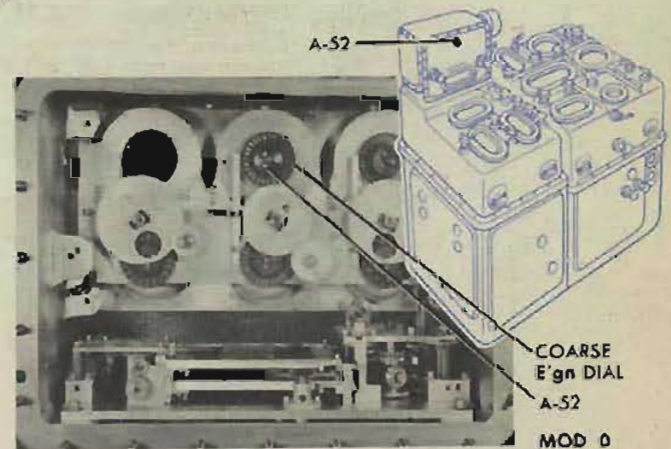
On Mod 0, the coarse *E'gjn* dial should read 20. On Mods 1 and 2, the scribe mark should be at the fixed index.

Adjustment

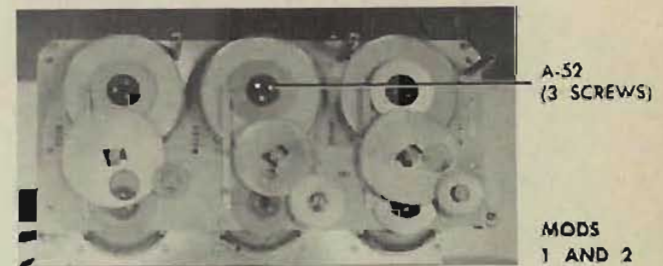
If the coarse *E'gjn* dial does not read 20, or the scribe mark is not at the fixed index, loosen A-52. Slip the dial to the correct position.

Tighten A-52 and recheck.

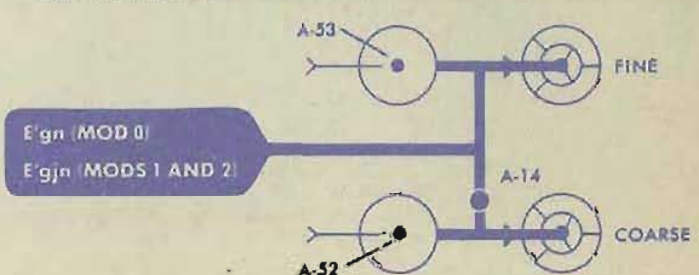
Check A-14.



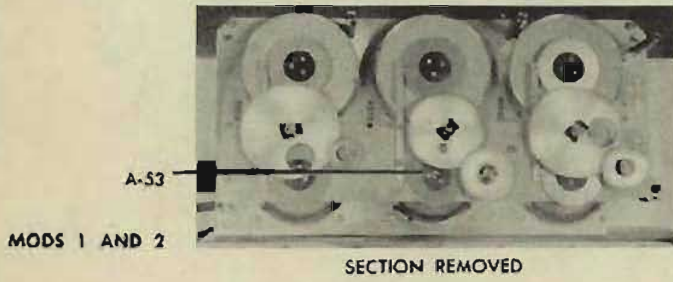
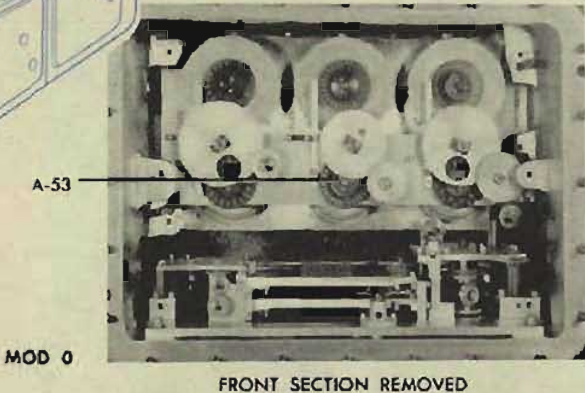
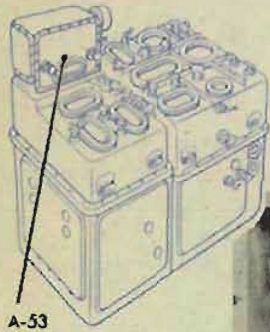
FRONT SECTION REMOVED



SECTION REMOVED



A-53 DIAL to FINE E'gjn SYNCHRO



Location

A-53 is under the front cover, on the fine *E'gjn* transmitter dial.

Check

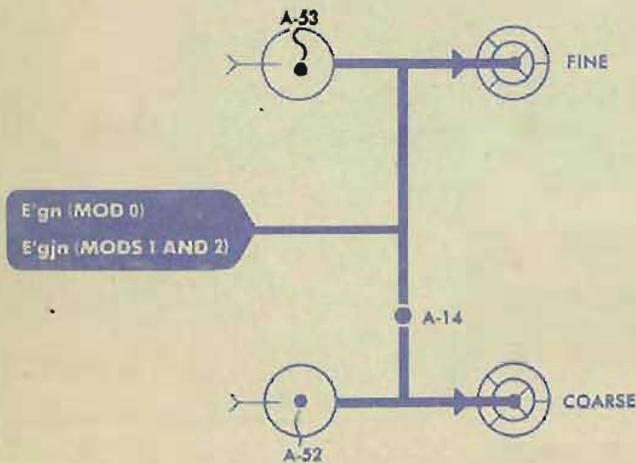
Set the fine *E'gjn* synchro at electrical zero.

On Mod 0, the fine *E'gjn* dial should read 00. On Mods 1 and 2, the scribe mark should be at the fixed index.

Adjustment

If the fine *E'gjn* dial does not read 00 or the scribe mark is not at the fixed index, loosen A-53. Slip the dial to the correct position.

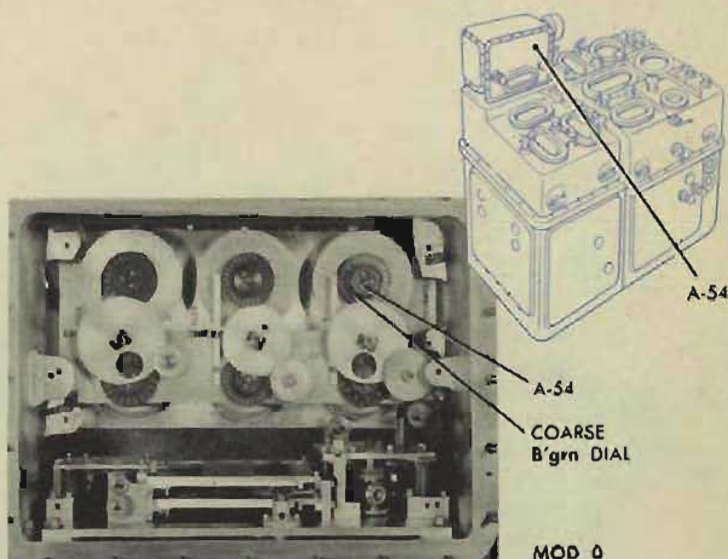
Tighten A-53 and recheck.
Check A-14.



A-54 DIAL to COARSE B'grjn SYNCHRO

Location

A-54 is under the front cover, on the coarse B'grjn transmitter dial.

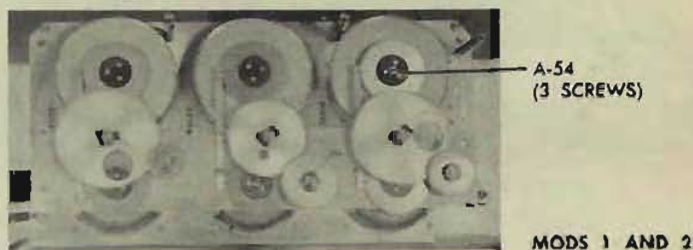


FRONT SECTION REMOVED

Check

Set the coarse B'grjn synchro at electrical zero.

On Mod 0, the coarse B'grjn dial should read 0. On Mods 1 and 2, the scribe mark should be at the fixed index.

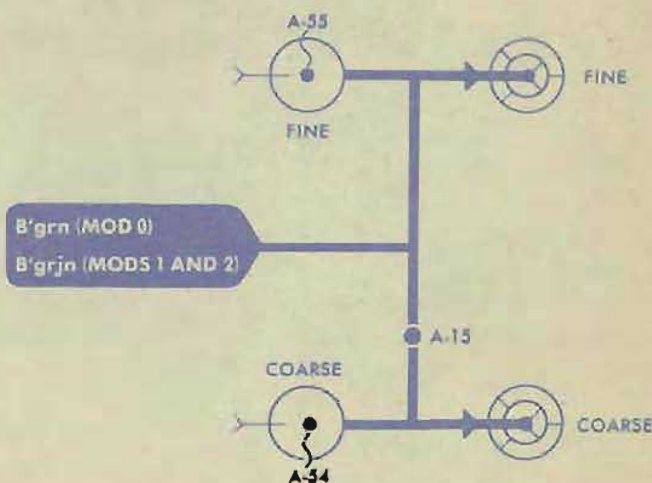


SECTION REMOVED

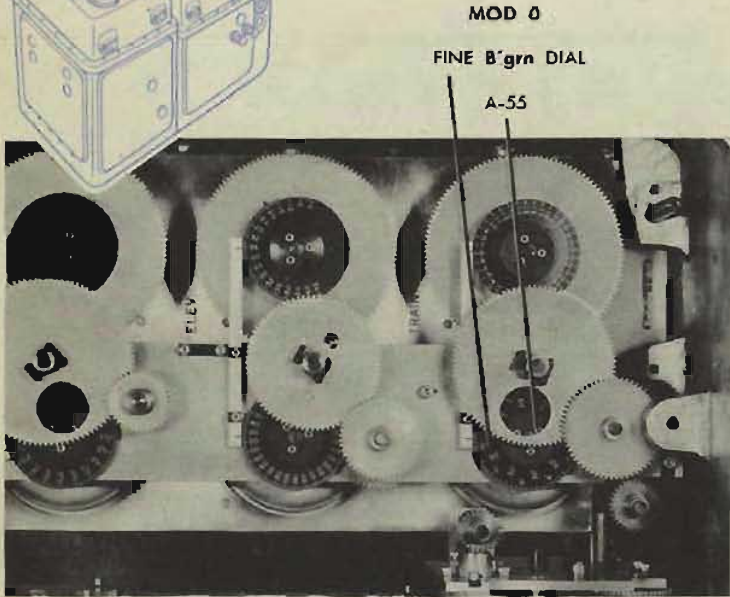
Adjustment

If the coarse B'grjn dial does not read 0, or the scribe mark is not at the fixed index, loosen A-54. Slip the dial to the correct position.

Tighten A-54, and recheck.
Check A-15.



A-55 DIAL to FINE B'grjn SYNCHRO



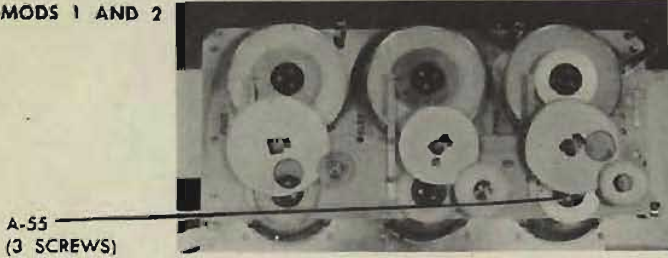
Location

A-55 is under the front cover, on the fine B'grjn transmitter dial.

Check

Set the fine B'grjn synchro at electrical zero. On Mod 0 the fine B'grjn dial should read 0°. On Mods 1 and 2, the scribe mark should be at the fixed index.

MODS 1 AND 2

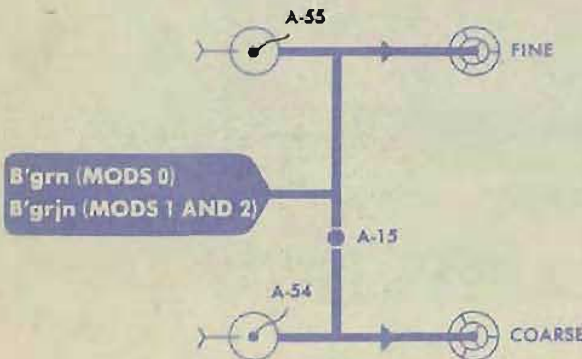


Adjustment

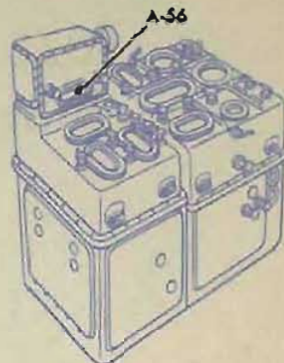
If the fine B'grjn dial does not read 0°, or the scribe mark is not at the fixed index, loosen A-55. Slip the dial to the correct position.

Tighten A-55, and recheck.

Check A-15.



A-56 DIAL to Rjn SYNCHRO

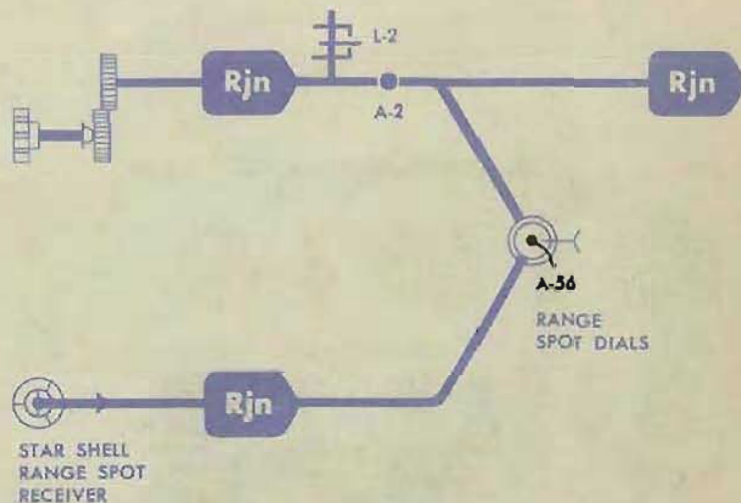


Location

A-56 is under the front cover, on the inner *Rjn* dial.

Check

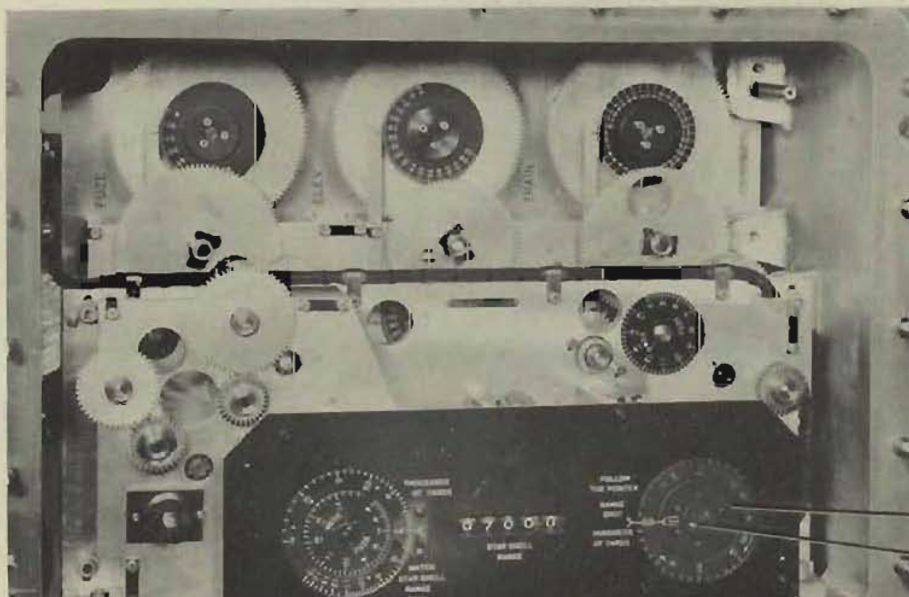
Set the *Rjn* synchro at electrical zero. The pointer on the inner *Rjn* dial should match the fixed index.



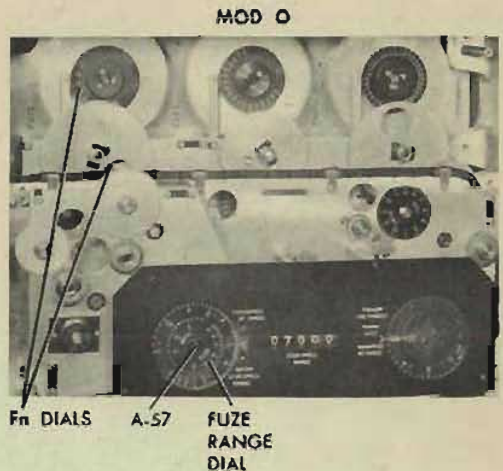
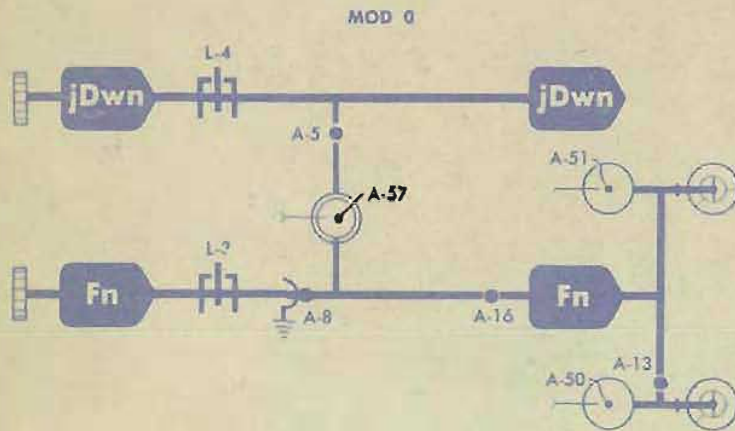
Adjustment

If the pointer on the *Rjn* dial does not match the fixed index, loosen A-56. Slip the dial to the correct position.

Tighten A-56, and recheck.



A-57 FUZE RANGE DIAL to Fn DIALS



Location

A-57 is under the front cover, on the fuze range dial.

Check

For powder fuze, Mod 0:
Set the *Fn* dials at 10.60 seconds.
The fuze range dial should read 5,000 yards.

For mechanical fuze, Mod 0:
Set the *Fn* dials at 14.50 seconds.
The fuze range dial should read 7,600 yards.

For mechanical fuze, Mod 1:
Set the *Fn* counter at 14.50 seconds.
The fuze range dial should read 7,600 yards.

For mechanical fuze, Mod 2:
Set the *Fn* counter at 20.02 seconds.
The fuze range dial should read 12,000 yards.

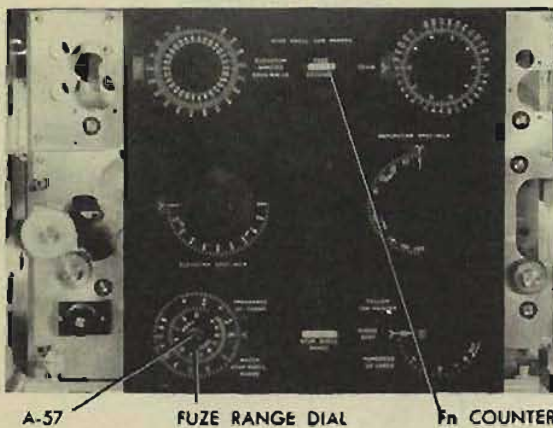
Adjustment

If the fuze range dial does not read the correct value, loosen A-57. Slip the dial to the correct reading.

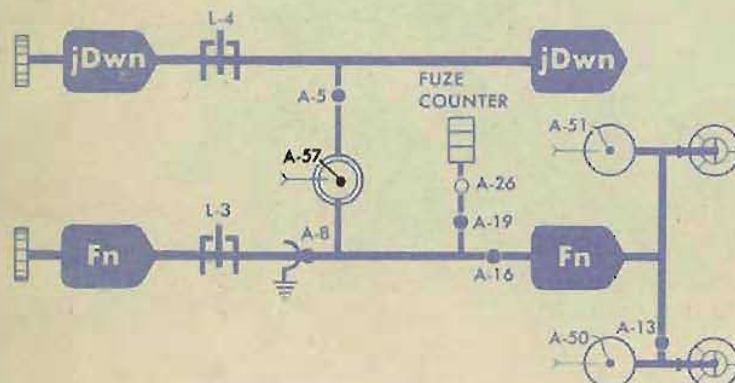
Tighten A-57, and recheck.

Readjust A-231.

MODS 1 AND 2



MODS 1 AND 2



A-58 FINE to COARSE E'gjn DIAL

Location

A-58 is under the front cover, on the fine E'gjn dial.

Check

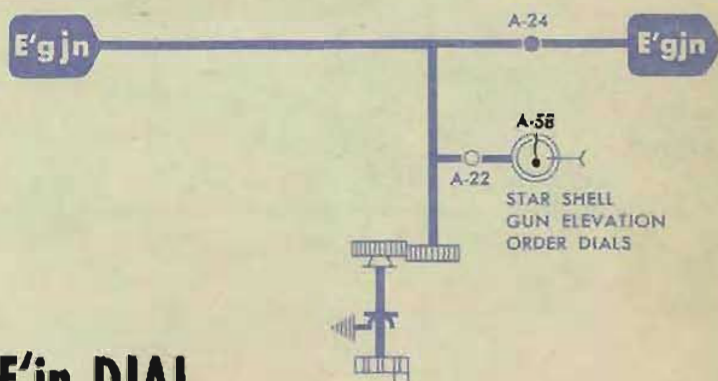
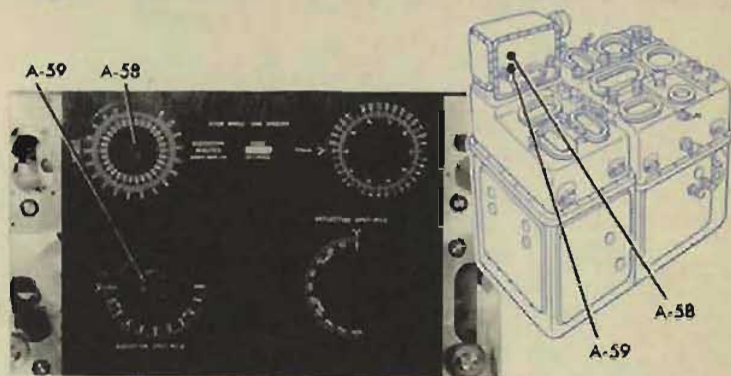
When the ring dial is at 20, the fine inner dial should be at 00. (Any one of the six 00 graduations may be used.)

Adjustment

If the inner dial is not at 00, loosen A-58. Slip the inner dial to read 00.

Tighten A-58, and recheck.

Check A-24 in the star shell computer, and A-231 in Computer Mark 1.



A-59 COARSE to FINE E'jn DIAL

Location

A-59 is under the front cover, on the coarse E'jn dial.

Check

Set the 0 of the ring dial at the fixed index.

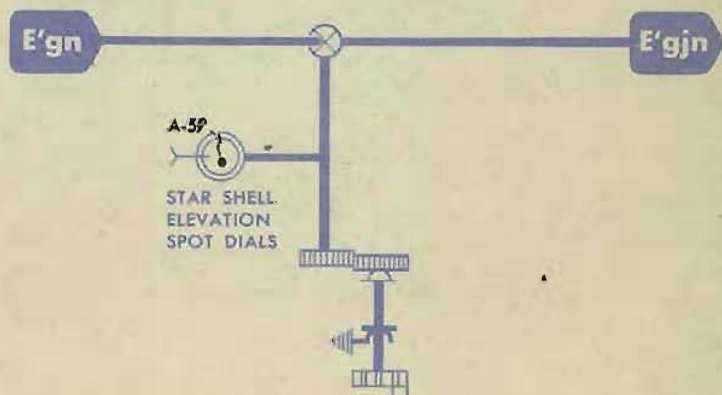
The center graduation on the inner dial should match the fixed index.

Adjustment

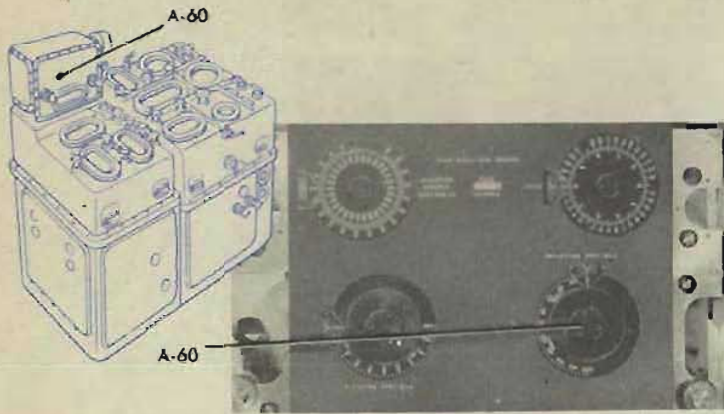
If the center graduation on the inner dial does not match the fixed index, loosen A-59. Slip the dial to the correct position.

Tighten A-59, and recheck.

Check A-231 in Computer Mark 1.



A-60 COARSE to FINE B'jn DIAL



Location

A-60 is under the front cover, on the coarse B'jn dial.

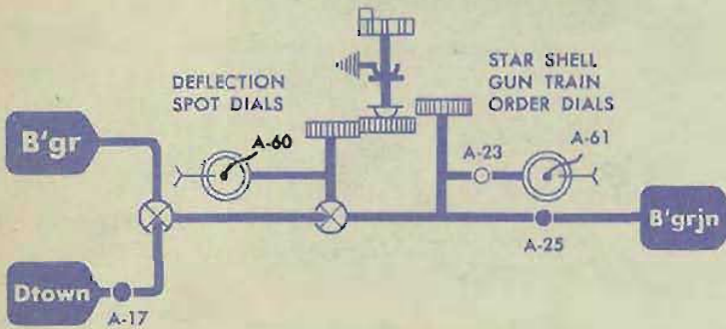
Check

Set the 0 of the B'jn ring dial at the fixed index.
The center graduation of the inner dial should match the fixed index.

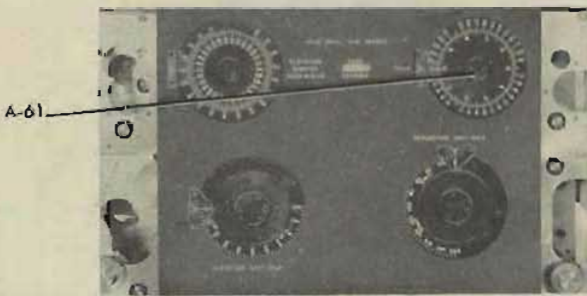
Adjustment

If the center graduation does not match the fixed index, loosen A-60. Slip the dial to the correct position.

Tighten A-60, and recheck.
Check A-17.



A-61 FINE to COARSE B'grjn DIAL



Location

A-61 is under the front cover, on the fine B'grjn dial.

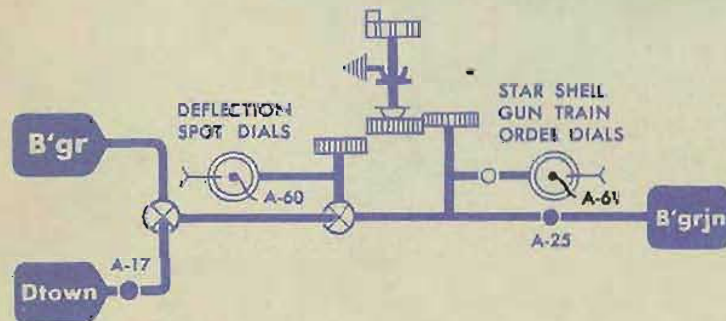
Check

When the coarse dial is at 0, the fine dial should also be at 0.

Adjustment

If the fine dial is not at 0, loosen A-61. Slip the fine dial to the correct position.

Tighten A-61, and recheck.
Check A-25 and A-17.



A-230 SYNCHRONIZING THE STAR SHELL DEFLECTION FOLLOW-UP

Location

A-230 is under cover 3 of Computer Mark 1.

Check

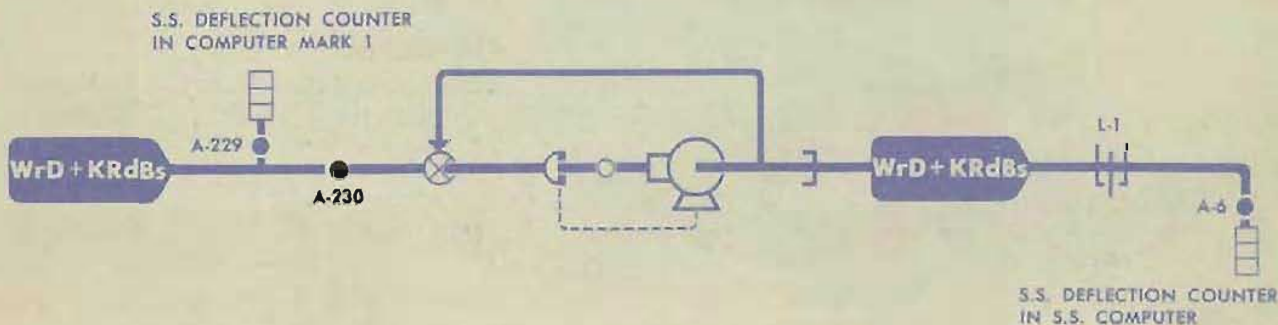
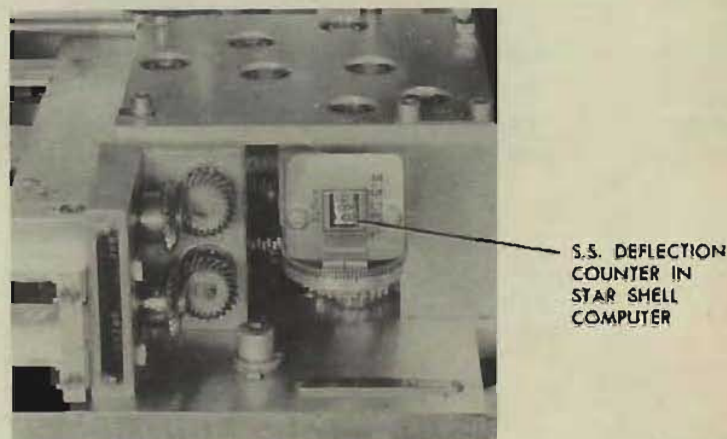
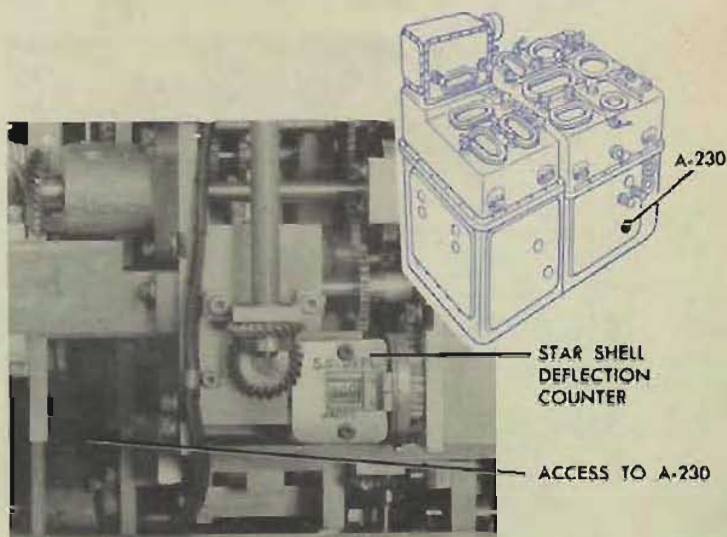
Turn the power ON.

Set Sw, So, and Sh at 0 knots. The star shell deflection counter in the star shell computer and the star shell deflection counter in Computer Mark 1 should both read 0 knots.

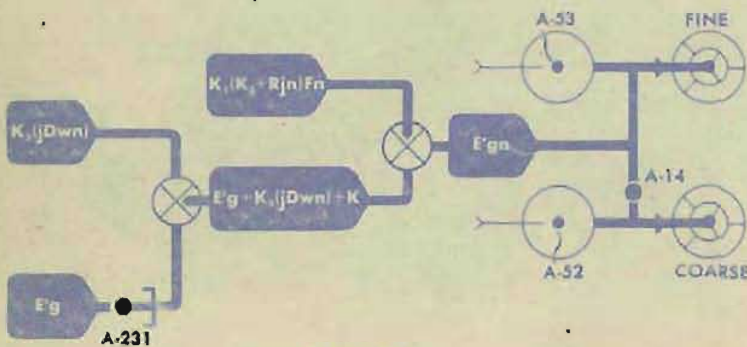
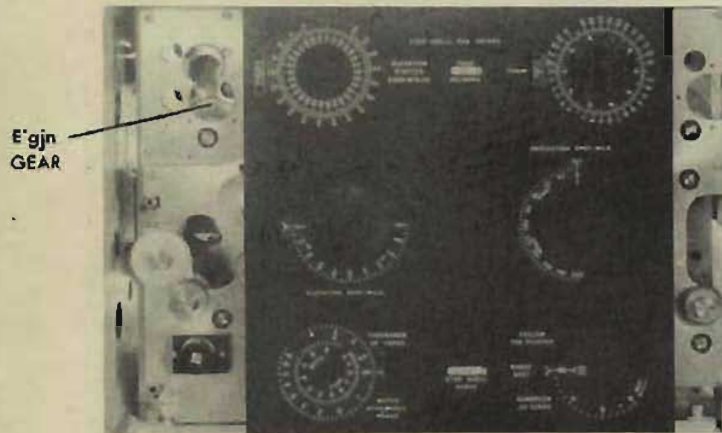
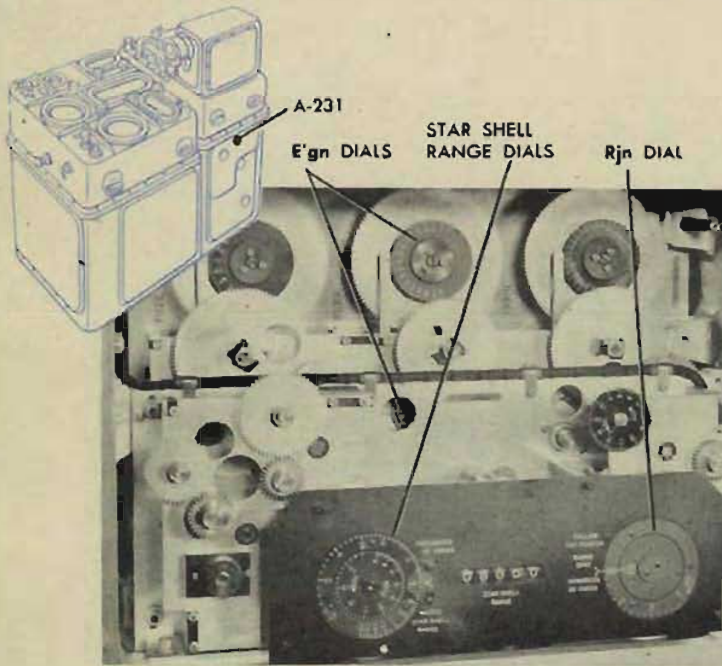
Adjustment

If the counters do not agree, slip-tighten A-230. Turn the coupling at the rear of A-230 to resynchronize the follow-up until the two counter readings agree.

Tighten A-230, and recheck.



A-231 E'gn DIALS to E'g DIALS



MOD 0

Location

A-231 is located under cover 6 in Computer Mark 1.

Check

For mechanical fuze, Mods 0 and 1:
Set both the star shell range ring dial and the fuze range dial at 8,000 yards.
On Mod 1 set *E'jn* at 0.

Set *Rjn* at 0.

The *E'gn* dials (*E'gjn* dials on Mod 1) should read 373' more than the *E'g* dials.

On Mod 1, check A-22 before readjusting A-231.

For powder fuze, Mod 0:

With the same settings as above, the *E'gn* dials should read 383' more than the *E'g* dials.

For mechanical fuze, Mod 2:

Set both the star shell range ring dial and the fuze range dial at 10,000 yards.

Set *E'jn* at 0.

Set *Rjn* at 0.

The *E'gjn* dials should read 339' more than the *E'g* dials.

Check A-22 before readjusting A-231.

Adjustment

If the *E'gn* (or *E'gjn*) dials do not read the correct amount more than the *E'g* dials, loosen A-231.

For Mod 0:

Hold the *E'g* line. Turn the *E'gn* gearing until the correct *E'gn* reading is obtained.

For Mods 1 and 2:

Hold the *E'g* and *E'jn* lines. Turn the *E'gjn* input gear until the correct *E'gjn* reading is obtained.

Tighten A-231 and recheck.

HANDCRANKS

The handcranks in the Star Shell Computer Mark 1 have adjustable friction relief drives and holding frictions. The fuze range and the range spot knobs have friction relief drives only. The elevation and the deflection handcranks, not on the Mod 0 instruments, have friction relief drives and holding frictions. Disassembly and repair of a typical handcrank is discussed in OP 1140A.

HOLDING FRICTION

Location

The holding friction is inside the handcrank.

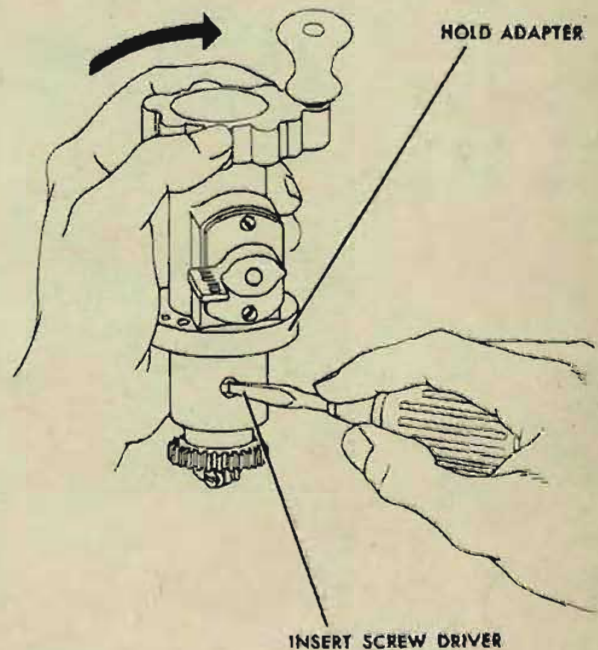
Check

The holding friction should be tight enough to maintain the setting of its quantity under normal operating conditions, yet loose enough for easy operation.

Adjustment

Remove the handcrank from the cover and set it in the outer position. Turn the knob until the adjustment slot appears in the opening; then insert a small screw driver into the slot. Turn the knob clockwise to increase the friction or counterclockwise to decrease the friction.

TURN KNOB CLOCKWISE
TO INCREASE FRICTION



FRICTION RELIEF DRIVE

Location

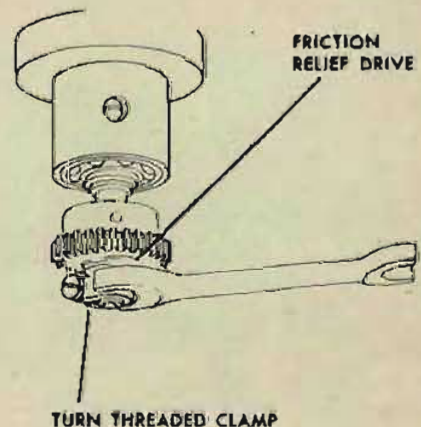
The friction relief drive is at the input gear on the end of the handcrank shaft.

Check

The friction relief drive should be tight enough to drive the line, but loose enough to slip without damaging the shaft line whenever a limit stop is reached.

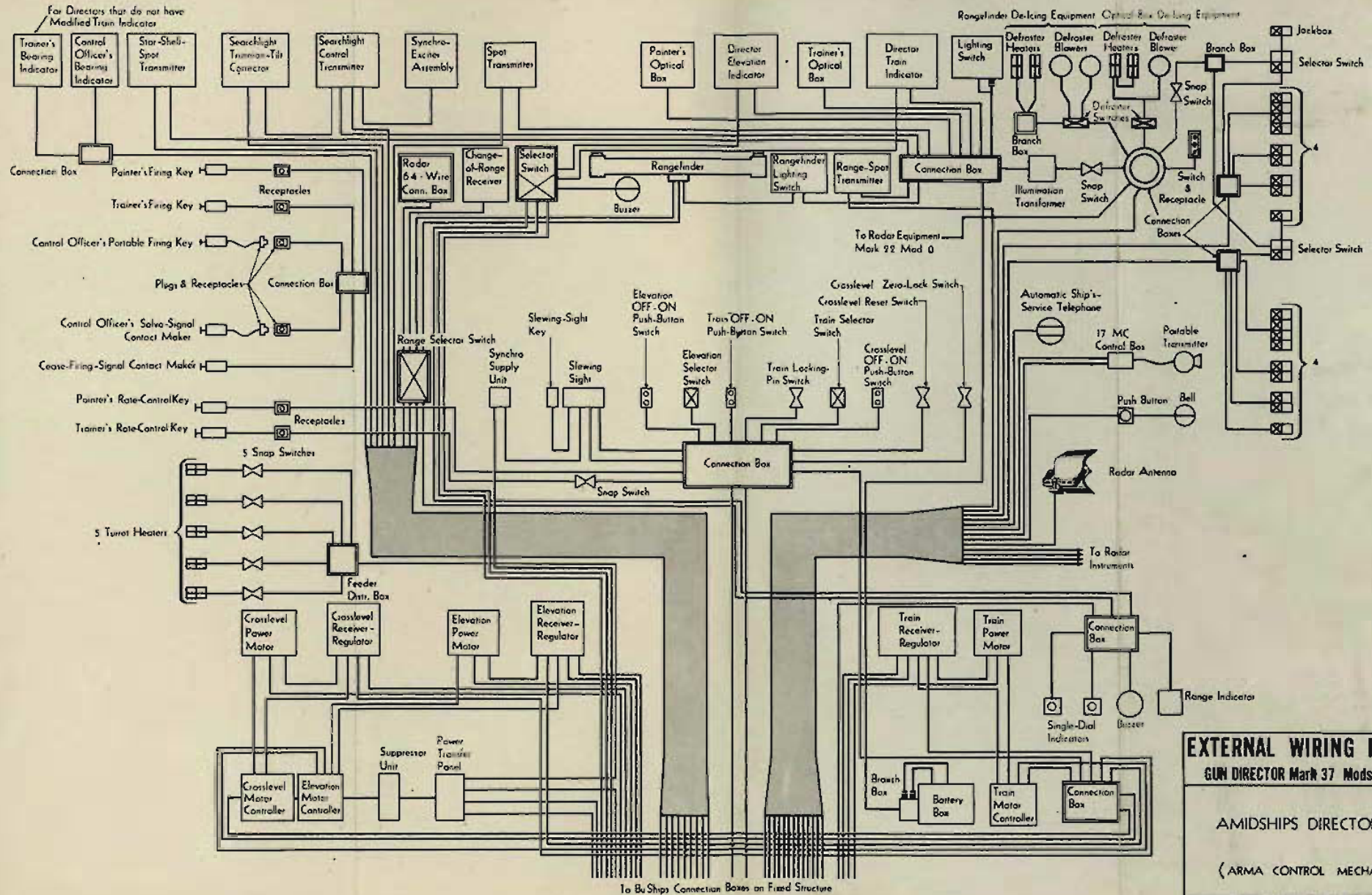
Adjustment

Loosen the threaded adjustment clamp and turn it clockwise to increase the friction or counterclockwise to decrease the friction. Tighten the clamp.



199.6

20.15



EXTERNAL WIRING DIAGRAM
 GUN DIRECTOR Mark 37 Mods 9 and 87
 AMIDSHIPS DIRECTOR (BB)
 (ARMA CONTROL MECHANISM)
 REFERENCE: ORDNANCE DWG. No. 244 117

Fig. 524